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HANDBOOK OF COMMUNICABLE DISEASES

FOR THE USE OF
MEDICAL OFFICERS OF SCHOOLS

Formerly a Code of Rules

ISSUED BY
THE MEDICAL OFFICERS OF SCHOOLS ASSOCIATION

ELEVENTH EDITION

LONDON
J. & A. CHURCHILL, LTD.
104 GLOUCESTER PLACE
PORTMAN SQUARE
1948

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The Preface of the Eleventh Edition

Sixty-two years ago our first code of rules was published. We now feel that our rules should no longer be a code but a handbook so that the inquiring school doctor or school master can as far as possible follow the reason for our advice. Since our last edition in 1940, the American Public Health Association has published in consultation with representatives of the Medical Staff of the British Ministry of Health their booklet "The Control of Communicable Diseases", and we have adopted their format in presenting each disease, giving recognition of the disease by clinical criteria with laboratory verification, the etiological agent, the source of infection, the mode of transmission, the incubation period, the period of communicability, susceptibility, and immunity, the prevalence, and the methods of control, and adding a new item "return to school".

It is essential to be as uniform as possible in our methods of control and we would like to place on record our appreciation that the Chief Medical Officer of the Ministry of Health asked for our comments on the booklet before it was published. Among the additions which we have made are notably a section on pneumonias, on the various types of jaundice, and on the basic principles of health.

The Committee has met on ten occasions. They are :—

Dr. G. O. Barber, Medical Officer to Felsted School.

Dr. C. M. Billington, Medical Officer to Haileybury and Imperial Service College.

Dr. W. H. Bradley, a Medical Officer, Ministry of Health.

Dr. J. A. H. Brincker, sometime a principal Medical Officer, L.C.C.

Dr. A. H. Gale, a Medical Officer to the Ministry of Education and of Health.

Dr. M. Mitman, Medical Superintendent, River Fever Hospital.

Dr. R. E. Smith, Medical Officer, Rugby School.

The bulk of the work has been done by our honorary secretary, Dr. C. M. Billington, to whom we give our real and sincere thanks.

Though for each edition a new committee is appointed by the council, communications addressed to the Honorary Secretary, Medical Officers of Schools Association, at 11 Chandos Street, London, W. 1, will be welcomed, especially if any member has any knowledge which can be incorporated in future editions. Thus, the frequent use of the word "unknown" may be lessened.

R. E. SMITH.

January, 1948.

Preface to the First Edition

In bringing this Code of Rules before the general public and the Medical and Scholastic professions in particular, the Medical Officers of Schools Association desire to say a few words as to its compilation.

On the formation of the Association in 1884 one of the most urgent matters which forced itself to the front, as claiming immediate attention, was the need for the general adoption of more definite rules for guarding our great educational establishments from the outbreak and spread of preventible infectious disease.

With this object an attempt was made to ascertain the rules and customs which are at present enforced in such cases, by circulating to every school of any importance in the country an elaborate series of questions covering the ground of this inquiry.

The replies thus obtained proved very interesting, and contained much valuable material; at the same time they revealed wide differences of procedure in different institutions when dealing with the same conditions of disease, and, in some instances, a considerable laxity of precaution. Nothing could more clearly demonstrate the necessity for some definite and generally recognized standard of School Hygiene than the curiously divergent character of many of the answers furnished in response to our paper of questions on the commoner epidemic diseases.

In the course of their deliberations on the information thus collected, the Association have embodied opinions and suggestions from many special authorities on the several questions dealt with. It is hoped that the result of these labours may prove no less useful to parents and guardians, who deal with the home life of the children, than to the school authorities, since without the sympathy and intelligent co-operation of the former no real progress can be made in this great department of preventive medicine, which is fraught with so much benefit to the community at large.

The Medical Officers of Schools Association cannot allow this Code to go forth to the public without placing on record the great debt of gratitude which they owe to their indefatigable Secretary, DR. ALDERSMITH, the Medical Officer of Christ's Hospital. This Code is to a very large extent based on the valuable paper on "*The Preventive Treatment of Infectious Diseases in Public and High Schools*", read by him at *The Conference on School Hygiene*, at the International

Health Exhibition. The extensive correspondence involved in communicating with a very large number of schools and of individuals in all parts of the Kingdom has been entirely in his hands ; upon him devolved the heavy labour of comparing and collating the replies received from the various authorities consulted ; and upon him, too, has fallen the duty of preparing this work for the press.

C. J. H. EVATT, M.D.,

Surgeon-Major Army Medical Staff,

President, M.O.S.A.

WOOLWICH.

January, 1885.

HANDBOOK OF COMMUNICABLE DISEASES

FOR THE USE OF MEDICAL OFFICERS OF SCHOOLS

SECTION I MEDICAL RESPONSIBILITY

The achievement of school health depends on the smooth working of the medical service according to plan. The occurrence of illness among the pupils is an important incident in the life of the school, and infectious diseases are the most important.

Precautions are necessary to prevent the introduction of infection into a school, and if it has been introduced, action is necessary to control its spread, and to deal with the sick.

1. The **School Doctor** should possess **undivided responsibility** in dealing with the circumstances.

The school community includes not only the pupils, but everybody who is concerned with the working of the school, i.e. masters, their families and servants, all other servants, and all visitors to the school premises. Epidemiological control is as important as medical treatment of the sick.

2. The school doctor (or doctors) should be appointed by the governing body of the school and shall be responsible to it. He must respect the jurisdiction of the head master in so far as his duties may affect the discipline and timetable of the school community. It will be his duty to decide whether a pupil who has had or recovered from any illness, or who has recently been exposed to infection can safely be admitted to school. It will be his duty to decide the period of quarantine of a pupil and what disinfection arrangements shall be carried out in any part of the school premises. Generally he shall have the power to act as the epidemiologist for the prevention and control of infectious and epidemic diseases.

3. The medical officer of the school should realize that the school is part of a community for the health of which the medical officer of health has responsibilities.

4. The medical officer, either alone or with the assistance of a qualified sanitary inspector, shall at least once a year inspect and report on the sanitary conditions of the school premises.

When making his report to the governing body he should state what alterations or improvements are necessary to promote the health and well-being of the pupils and the staff of the school.

The medical officer should further make an annual statement to the governing body referring to the general state of health of the pupils; what illnesses there have been and to what extent, and any untoward circumstances affecting school life.

SECTION II

GENERAL HYGIENE

I. In the periodic inspection the following matters, however, require special attention :—

1. All **drains** should preferably be of iron piping; they must be laid satisfactorily, efficiently ventilated, and cut off from the sewer by a disconnecting chamber.

2. All **soil** and **vent pipes** should be fixed outside the buildings; soil pipes should be straight without any bends, vent pipes carried above the eaves of the building, and ventilated full bore to the open air.

Pipes should be properly disconnected from the sewer.

The joints of all soil and drain pipes and their branches should be air and water-tight.

If possible drain pipes should not pass under the school buildings. If this cannot be avoided special conditions must be satisfied.

3. **Closet-basins** should be of the wash-down type, preferably syphonic in action (Corbel type). These will prevent the accumulation of sediments and prevent the passage of drain gases. **Closet chambers** should be effectively ventilated to the open air, and be above ground level.

4. Facilities for hand-washing should be provided in all closets.

5. In rural areas where satisfactory drainage is not provided, it may be necessary to provide **Chemical Closets**. These should be placed in a building detached from the school, and the maker's instructions strictly observed.

Cesspools should never be used. When they exist they should be replaced by a septic tank system, and the overflow allowed to pass over satisfactory filter beds ; these should be kept under observation.

6. **Waste and overflow pipes** from all sanitary fittings, such as sinks, handbasins, baths, and waste water preventer, should discharge into the open air, and the waste shall be led to a suitably constructed and trapped gulley.

7. Suitable portable **dust-bins** should be provided. They should be made of metal with a water-tight lid. They should be kept at a distance from the house, placed on a water-tight surface, easily kept clean, and the bins emptied frequently—if possible every morning.

Some sanitary authorities now provide containers which may hold one or two hundredweight. These are by arrangement removed and emptied daily.

8. Gullies and rain-water pipes require frequent attention—they should be cleared of debris frequently and flushed.

Gullies from kitchen and scullery sinks require special attention ; they should be flushed at least once a week with a pail of boiling water to which has been added a handful of washing soda. The gulley trap itself requires inspection, and any grease or accumulated debris removed.

9. A detailed plan of the drainage, gas and electricity, and water mains of all school premises should be available and should be kept up to date.

II. **Dormitories and Cubicles.** (Memorandum on the draft Building Regs. 28-35. Education Act, 1944.)

The Ministry of Education has laid down certain **minimum** standards of which the following is a summary:—

1. The number of children in any one dormitory should generally be as small as possible, taking into account the question of supervision, and should not in any case exceed 20. The number of children under the age of 7 years in a single dormitory should not exceed six.

2. For the ventilation of dormitories, natural cross ventilation should be relied on.

3. In schools for girls over 12 years of age dormitories should normally be divided into cubicles.

4. A number of single bedrooms of not less than 80 sq. ft. should be provided in place of cubicles for the use of older boys and girls during the last year or two of their school life.

5. Space for clothes will be required and should be provided either in chests or drawers or cupboards, or, for younger children, in separate wardrobe rooms.

6. The above are useful minima, but it is important to regulate that the distance between bed centres should be at least 6 ft.

III. Lavatory and Sanitary Provisions.—1. In girls' schools there should be satisfactory arrangements for securing privacy in the washing arrangements for older girls, and proper bins for reception of used sanitary towels should be provided in each water-closet compartment.

2. All showers—where provided—should be fitted with proper flushing valves.

3. A wash hand-basin with running hot and cold water should be provided in all dormitories, and in all single bedrooms for children and staff.

4. Facilities for washing clothes and bed linen should be provided.

A steam laundry run on hygienic lines is both economical and safe. Public laundries are a serious drain on the school through loss of clothing and wear and tear, more especially in bed linen and all starched articles.

IV. Common Rooms and Studies.—1. Not less than 30 sq. ft. per person should be allowed for studies ; and in no case should the room be smaller than 120 sq. ft.

The ideal size for common rooms is 900 sq. ft.

2. In schools for children under 11 years joint common rooms should be provided. In schools for children over this age it is desirable to provide separate as well as joint common rooms for boys and girls.

3. Separate common rooms should be provided for the younger children in schools of more than twenty-five children under the age of 11 years.

4. A separate quiet room or house library will be a great advantage to the pupils.

5. Lockers or other storage arrangements should be provided for children's personal belongings.

V. Teaching Staff Accommodation.—Residential accommodation should be provided in the same building as the dormitories for the master or masters in charge of the boarders. There should be at least a study bedroom for each member of the resident staff as well as a staff common room.

Adequate washing and sanitary accommodation for the staff should also be provided, separate from that provided for pupils.

VI. Water supply to the School Premises.—The supply should comply with all the rules required for a good and wholesome potable water. If the school supplies its own water (i.e. from a spring or a well) it must be examined chemically and bacteriologically at frequent intervals ; if there is any danger of the water becoming contaminated either at its source or in the process of being pumped into cisterns, it should be chlorinated. If supplied by a water undertaking this is generally unnecessary.

1. Water for drinking should be obtained from a constant service pipe. If the water supply is intermittent, or derived from wells, special cisterns should be provided for drinking and cooking purposes, separate from the cisterns which supply water closets, urinals, and slop sinks. Such cisterns should be properly labelled.

2. All water cisterns should be suitably placed, properly covered, and easily accessible for inspection, periodic cleaning, and repair. From time to time they should be emptied, cleaned, and lime washed before being put into use again.

3. As water from surface wells is liable to contamination or pollution from adjacent drains, from surface washings, and from faulty drains or cesspools, it should always be chlorinated before use.

4. If **filters** must be used they should always be of the pressure type. They should be disconnected, cleaned, and sterilized by boiling at least once every fortnight. Care must be taken when replaced that they are not worn or cracked, or possess flaws which will interfere with the effective filtering of the water.

VII. Milk Supply.—Milk is an essential food of every growing boy and girl. Pædiatricians and dieticians both insist that every child shall have at least one pint of pure milk every day. School authorities should therefore arrange for an adequate supply daily (or better still twice a day) to the school. The supply should be fresh, cool, free from dirt and free from infection. The safest way to ensure these conditions is to obtain milk that has been pasteurized, or heat treated, by an efficient process.

Milk is subject to the requirements of the Milk and Dairies Order for proper handling, cleanliness, etc., and to the Milk (Special Designations) Regulations (1936 to 1946) for conditions of pasteurization.

The school authority's contract for milk should state explicitly the type of milk, the quantity, the number of daily deliveries, the utensils in which it should be delivered, and the cleansing and sterilization of them, as defined in Government regulations. The contract should include a penal clause, providing that if at any time the milk supplied by the contractor is found on delivery not to be of the "nature, substance, and quality demanded", milk in substitution may be purchased elsewhere and charged against the contractor. The law for ensuring purity of milk to the public is now so clearly defined that the school authority should contact the officers of the local authority in any cases of doubt or difficulty.

The school authority, for their part, should ensure that their own arrangements as to receipt, storage, and distribution are as stipulated in the contract. Some public schools obtain milk from their own herd. It is advised that only attested cows should be kept for the production of Tuberculin Tested (T.T.) milk. Experience has shown that accredited milk is as often infected as ordinary raw milk. T.T. milk is usually free from infection with tubercle bacilli, but not necessarily from the organisms of other bovine and human diseases. Tuberculin tested pasteurized is the safest milk which can be obtained. School farms should be kept under close inspection by the medical officer of the school, assisted by a competent veterinary surgeon. Milk should be collected hygienically into suitable utensils previously sterilized, cooled immediately after milking to below 45° F., and kept in a cool milk store until needed.

The milk from a school-owned herd should be submitted for analysis of its chemical content, its purity, and the possible presence of tubercle bacilli. Milk has often been the vehicle of infections in schools. It is a perfect medium for the growth of bacteria which may be conveyed to it in a number of ways; the cow may suffer from disease, the milker may be a carrier of disease, the receptacle may be unclean or may have been washed with contaminated water. Apart from the tubercle bacillus and the bacilli of undulant fever the milk may harbour hæmolytic streptococci producing sore throat and scarlet fever, diphtheria bacilli, and those of the enteric, dysentery, or the salmonella groups of bacteria.

Boiling suspected milk for five seconds is an emergency method for destroying most organisms of disease; but the process affects the taste of the milk, and though the loss of its nutritional value is only slight, it is better for the school authority to buy properly pasteurized milk.

VIII. Food Supplies.—Food delivered to the school by contractors, and the stores at the school, should be inspected at frequent intervals by the medical officer.

He should also periodically visit the kitchen and sculleries and the dining hall to see that the cooking and washing arrangements and the serving of the meals are satisfactory.

Washing arrangements, including the provision for washing the hands and the provision of towels and soap for the purpose, should be carefully supervised and should always be satisfactory. The habit of hand washing after defæcation and urination should be inculcated into the staff.

All food should be properly protected against vermin, mouse, and rat infestation, and no opportunity should be given for flies to settle on it at any time between preparation and serving. Perishable stores should be kept in a refrigerator. Cold dishes, such as trifles or custards, should be consumed within a short time after preparation. They should never be held overnight.

Schools where there are a large number of resident boys or girls should employ a dietician to advise on matters of diet and food values generally.

SECTION III

MEDICAL ADMINISTRATION

1. Every school should have its own sick quarters (sanatorium), preferably situated away from the general school buildings, but within the school grounds. The idea of a "pest house" for infectious diseases

and a "sick house" for minor ailments is old-fashioned and unnecessary. If properly planned, and if suitable nursing precautions are taken, all cases can be treated in the same building. In addition to isolation wings there should be cubicle blocks or groups of one-bed wardlets which can be separated off completely, with kitchen, bath-rooms, and nurses' duty rooms, etc. These units can be used for different infections, but should, of course, be disinfected after each epidemic. (See Section V.)

It can never be possible to staff and maintain sufficient beds for epidemic conditions, e.g. influenza, when a large number of the community may be ill within a short time. Ten per cent of the total school population should be sufficient beds for ordinary purposes. Of these, at least 25 per cent should be in one-bed wardlets and used for observation and isolation. Preparatory schools with their higher proportion of non-immune children require a larger proportion than public schools. Secondary infections and cross-infection can be minimized by adequate bed spacing in large wards, but it is more surely prevented by isolation of infectious patients in one-bed wardlets. Adequate recreation and dining rooms for convalescents are essential.

Every school should realize that dormitories will have to be used occasionally as sick rooms, and the head master and medical officer should make the necessary arrangements before the emergency. These may have to be varied with circumstances, but the basic principle should be settled well in advance. This particularly applies to preparatory schools. Architects advising on new buildings or altering old ones should have this possibility brought to their notice.

2. **Nurses** should be State Registered or hold the children's certificate, and preferably also have had fever nursing experience. It should be possible to accommodate extra staff in or near the sanatorium in case of epidemics.

3. **Sick Rooms.**—Schools with detached houses will find two small rooms for every fifty boys of great value, but these should only be used for very mild cases or for those in need of 24 or 48 hours' rest. A case of real illness should always be sent to the sanatorium.

4. **Medical Examinations.**—A certificate should be required on the entry of each pupil giving his or her medical history, previous diseases, including infectious diseases, operations, deformities, or hereditary weaknesses. A letter from the family doctor is often helpful. This certificate should be signed by the parent or guardian and sent to the school before the boy's admission. The following certificate serves as a guide to what is required :—

Medical History

This certificate must be filled up and signed by the parent or guardian before the child is sent to the school. The suppression of important information as to

past or present health, or as to exposure to infection, is liable to be regarded as a breach of contract.

Name.....

Age.....

1. Has the pupil had—

Chicken pox ?	If so, when ?.....
Diphtheria ?	If so, when ?.....
Rubella (German Measles) ?	If so, when ?.....
Measles ?	If so, when ?.....
Mumps ?	If so, when ?.....
Scarlet Fever ?	If so, when ?.....
Smallpox ?	If so, when ?.....
Whooping-cough ?	If so, when ?.....
Enteric Fever ?	If so, when ?.....
Rheumatic Fever ?.....	If so, when ?.....
Any other infectious disease ?	If so, what ?.....
	and when ?.....

2. Has the pupil been successfully—

(a) vaccinated against smallpox ?	If so, when ?.....
(b) re-vaccinated against smallpox ?	If so, when ?.....
Actively immunized against—	
(c) Diphtheria ?	If so, when ?.....
(d) Scarlet fever ?	If so, when ?.....
(e) Whooping-cough ?	If so, when ?.....
(f) Any other disease ?.....	If so, when ?.....

3. Has the pupil—

had fits ?	If so, when ?.....
been ruptured ?	If so, when ?.....
had any discharge from the ear ?	If so, when ?.....

4. Is the pupil subject to any special form of illness, e.g. incontinence of urine ?.....
.....
5. Has the pupil had any surgical operation ? If so give particulars.....
.....
6. Does the pupil suffer from any ailment, or constitutional peculiarity, affecting the general health, sight, hearing, etc., etc. ?.....
.....
7. Are the teeth in good order ?.....
8. Is the pupil in your opinion fit in all respects for the ordinary school life ?.....
.....

.....
Parent (or Guardian).

Date.....

In all schools the medical officer should make a thorough physical examination of each pupil on entrance. Thereafter he should be re-examined at least every two years and progress (increase in weight, height, etc.) recorded. Vaccinations, inoculations, and immunizations should be recorded with dates. Any abnormalities or defects should be reported to the parent or guardian with advice as to any treatment necessary and its urgency.

5. **Records.**—A record should be prepared for each pupil containing all the facts revealed in the entrance certificate, those found at the initial medical examination, and kept up to date by subsequent entries as and when they occur through the school life of the pupil.

6. **Entrance Certificates.**—The medical regulations should be designed so that the parents know what is the school's view on quarantine, incubation, and surveillance. Parents must inform the school if a child has been exposed to any infectious disease. If there is any doubt of the course to be pursued, the medical officer should be consulted. The following are meant to act as a guide.

Medical Regulations

If your son is ill during the holidays please inform his house-master as soon as possible, stating all details bearing on his case, and the opinion of the doctor who attends him.

If in the course of the holidays your son is exposed to measles, chicken pox, rubella (German measles), mumps, or whooping-cough, diphtheria, and scarlet fever, he may return to school when term begins, provided he is kept away meanwhile from the source of infection.

If your son has been in the company of anyone who, during the following four days, develops poliomyelitis, encephalitis, or cerebro-spinal fever or typhoid (enteric fever) he should not return to school until the permission of the school medical officer has been obtained. If your son has any skin infection it is important to get it treated as quickly as possible. If these are of an impetiginous nature, or due to tinea (ringworm), details should be sent to the school and the medical officer will decide if the boy can return to school, in which instance he must report directly to the sanatorium so that the medical officer can decide if he requires further treatment or is fit to go into school.

You are specially requested not to send your son back with a sore throat or a heavy cold.

If, after your son has returned to school, infectious illness breaks out in his home, immediate notice of the facts should be forwarded to the school authorities if your home doctor considers there is a possibility of your son having been infected.

These regulations should be kept by the parent while the son is at school. In those schools who still observe quarantine the following health certificate will serve as an example.

Health Certificate

(To be presented by the pupil on return to the school after the holidays.)

This certificate must be filled in and signed by the parent or guardian not earlier than the day before that on which the pupil leaves for school.

I hereby certify that, to the best of my knowledge and belief,

..... has not, during the holidays now ending, suffered from or been exposed to any infectious disease, or entered any house where such disease existed. He is in good health and fit for ordinary school life and work.

.....
Parent (or Guardian),

Date.....

N.B.—If the pupil be exposed to any infection during the vacation *immediate* notice of the facts is to be sent to the school authorities ; and the pupil is on no account to return to school without permission having first been obtained from them.

If, within three weeks after the pupil has returned to school infectious illness breaks out in his home, *immediate* notice of the facts must be forwarded to the school authorities.

If a susceptible child has been exposed to infection, then the following certificate will be required:—

Certificate, After Exposure to Infection

(To be filled in, signed, and forwarded to the Medical Officer the day before the boy returns to school, after requisite period of quarantine.)

(Insert address)

I hereby certify that who was exposed to the infection of will have completed the quarantine period of days on (in accordance with the terms of your letter of); and that during this period he has not, to the best of my knowledge and belief, been exposed to the infection of that or any other disease.

The boy will return direct to the school sanatorium with all his luggage on about p.m.

.....
Parent (or Guardian).

Date.....

If the child has been ill the following certificate is required :—

Certificate, After Recovery from Illness

(To be filled in, signed, and forwarded to the medical officer the day before the boy returns to school, when the rules required by the school to be observed in such cases have been complied with.)

(Insert address)

I hereby certify that, House, who was taken ill with on is considered convalescent by his medical attendant; and that the period, after which you stated (in the letter dated), that the boy might return to school, expired on To the best of my knowledge and belief he has not, since the beginning of his illness, been exposed to any other infection.

The boy is in good health and fit for school life and work, and will report direct to the school sanatorium on about p.m.

.....
Parent (or Guardian).

Date.....

Schools have their responsibility for letting parents know when children have been exposed to infection at school. The following certificate is a sample :—

(To be sent to the Parent or Guardian when a susceptible child returns home after having been exposed to infection at school.)

..... may have been exposed to the infection
 was
 of on or about

The incubation period of the disease is about days ;
he should therefore be quarantined, or kept under observation, for at least

..... days, dating from If in
good health at the end of that time,
may then be considered to have escaped the disease.

Date

To.....

SECTION IV

BASIC PRINCIPLES OF HEALTH IN SCHOOLS

Certain principles should be continually in the minds of those responsible for maintaining a school child's health at a standard as high as possible.

1. **Physiological needs** should be considered. Heating should be adequate, but not oppressive. Fresh air, proper ventilation, sunshine, artificial light, and playgrounds are essential, but should not become a fetish. Excessive noise from traffic, railways, or aeroplanes should be avoided.

2. **Psychological needs** should be carefully weighed to ensure a proper balance of privacy, community, and family life. Undue physical or mental fatigue should be avoided when planning the curriculum.

3. **Hygiene** and **sanitary** regulations should be given careful consideration to protect pupils from impure water, contaminated milk, infected food, a faulty drainage system, vermin and flies, or overcrowding in dormitories or classrooms.

4. Adequate arrangements should be made to avoid **risks from accidents** due to fire, electricity, lightning, falling masonry, etc., or road accidents. Constant vigilance should be maintained over the swimming bath, and, if a school is situated on a main traffic road, supervision at rush hours is essential.

5. **Prevention of Infectious Diseases.**—Certain special precautions should be taken to minimize the spread of infectious diseases.

(i) If infectious disease starts in the neighbourhood it may become advisable to form the school into a "close community" by putting the town or village "out of bounds". Day boys, masters, or servants necessarily attending from outside may be required to obey special instructions issued on the advice of the school medical officer. This advice should be designed to consider primarily the safety of the majority while at the same time causing as little dislocation as possible of the movements and freedom of the minority.

(ii) Directly a person associated with the school is suspected of having or incubating an infectious disease he should be isolated. The medical officer will decide whether he should be removed to an infectious diseases hospital or treated in the school sanatorium.

(iii) A list of susceptible pupils should be prepared and issued to the matrons, house masters, and others concerned with a request that a careful watch be kept for any symptoms which might suggest he is incubating the disease.

(iv) When an infectious disease has become established every precaution should be taken to ensure that the segregation of those infected is complete. Refuse from food should be collected and removed to separate receptacles. It may be advisable for crockery to be washed up in the segregated part of the sanatorium. Paper balls, and such like, should not be thrown out of the windows. Animals should be excluded; and visitors allowed only by permission of the medical officer. He will also decide whether letters or post cards should be disinfected.

(v) When a patient is considered by the medical officer to be no longer infectious, though he may not have completed his convalescence, he should be given a bath and a change of clothing before he joins those in the non-segregated part of the sanatorium. His clothes and those possessions which have been with him during isolation may have to be disinfected. (See Section V.)

(vi) At the end of an epidemic of infectious disease, or as rooms no longer needed for segregation become empty, a thorough disinfection of the rooms and bedding will be necessary. (See Section V.)

6. **Information to Parents.**—In all cases of illness amongst pupils, parents or guardians should be informed at once and kept regularly supplied with a progress report. If an anæsthetic, operation, or other special form of treatment is necessary the parents' consent should be obtained; but when, in acute or urgent cases, it is impossible to get into touch with the parents, the head master or head mistress should take the responsibility. Parents should be informed of all details as soon as possible. Inquiries from parents about sick children

should be addressed to whoever is acting in *loco parentis* and to whom the medical officer reports regularly.

7. **Closure of a School.**—This is always a serious step to take, is very rarely necessary, and should only be decided upon when all the circumstances have been carefully considered. An outbreak of a serious infectious disease which becomes epidemic may afford sufficient justification for the temporary removal of healthy children by their parents or guardian, if they wish to take such a step. The onus should rest with the parents and not the school authorities, who should not go beyond advising the parents that they may adopt that line of action. If closure is decided to be necessary the local medical officer of health and the epidemiological branch of the Ministry of Health should be consulted. The head master should then inform all parents of the circumstances and the decision taken. At the same time he should inform them what precautions should be observed with regard to isolation and quarantine, and state the incubation period of the disease. Sufficient time should be given for the necessary arrangements for travelling and home isolation to be made.

8. **Duty of School Authorities.**—The parents or guardians on the one hand and the school authorities on the other have their mutual duties to keep the school free from infection. The school authority should see that pupils do not take infection back into their homes, just as parents should not allow them to bring back infection from the home into the school. If, therefore, infection occurs in the school so that pupils may be incubating it at the end of term parents should be given adequate warning. The nature of the infection, the date when the last case had to be isolated, the probable incubation period, and whether the pupil concerned is considered susceptible should be stated. Any pupil suspected of incubating the disease after travelling arrangements have been made but before actually leaving should be detained and the parents informed immediately. It may be necessary to have an inspection by the medical officer on the day of travelling.

SECTION V

DISINFECTION

General Theory of Disinfection

The purpose of disinfection is the destruction of the germs of the disease. Many methods both chemical and physical are practised, and some elaborate devices, having been proved superfluous, have given place to simpler methods such as washing with soap and hot water, or exposure to fresh air and sunlight. The patient is the usual source of infection, and disinfection should start as near the source

as possible. All discharges from the patient should be disinfected as soon as possible after they have left the patient. This implies **concurrent disinfection**. At the end of an illness all articles which may have been contaminated with infectious discharges should be disinfected. This is **terminal disinfection**, and obviously it will be of less importance if concurrent disinfection has been thorough.

Modes of Disinfection

Total Destruction by HEAT.—For some diseases, such as common cold, the discharges should be burnt. Paper handkerchiefs or pieces of linen should be frequently changed. When used they should be put into a paper bag and burnt. If linen handkerchiefs continue to be used they also should be put into a bag and the nurse should boil them before they are sent to the laundry. Dressings, such as those from discharging ears, nostrils, mastoids, appendicitis, or any discharging wounds, should also be burnt.

Boiling Water.—Crockery and cutlery, which may convey infection, must be kept in boiling water for ten minutes before being sent to the kitchen.

Steam Disinfection for Clothing, Blankets, Linen, etc.—High-pressure steam is the most suitable and the quickest means of destroying all disease germs, including the most resistant spores. A modern apparatus uses "dry saturated steam", i.e. it contains no droplets or fine mist. In this condition its powers of penetration and carrying and transferring heat are at a maximum. The goods to be disinfected are put into a cylinder with a door at each end, so that "dirty" articles can be put in at one end and removed at the other, thus preventing the risk of the disinfected articles coming into contact with fresh infection at the dirty end. The disinfector has a cradle into which the goods are put.

The first preliminary is the production of a vacuum in the cylinder, as the presence of air prevents the thorough penetration by the steam. The cylinder is surrounded by a jacket. The pressure of the steam in the cylinder is 20 lb. per square inch and the temperature is 260° F. or 127° C., and in the jacket is 30 lb. per square inch and the temperature of steam is 275° F. or 135° C. There is a special hot air apparatus which ensures the provision of saturated steam in the cylinder for disinfection, and this also provides hot air for airing purposes. It is essential to have a higher pressure of steam in the jacket to keep the steam in the cylinder dry and to prevent condensation on the walls. After the disinfection the steam is ejected and hot air is drawn into the cylinder. The clothes are thus aired and can be used immediately after complete disinfection. They come out perfectly dry even if put in wet. Goods should remain in the disinfector at the maintained pressure for 15 to 20 minutes. No harm results to either

flannel or cloth so long as the disinfection is properly carried out. Care should be taken to protect the operator, either by wrapping infected things in a clean sheet or by using a container from which the articles can be tipped without being touched.

Disinfection of Boots, Books, Hair-brushes, Furs, etc.—It is best to put such articles in the disinfectant with formalin vapour. The chamber is exhausted of air and the goods remain in contact with formalin vapour for 45 minutes.

Disinfection of Excreta by Chemicals.—Chemical disinfectants, all of which are poisonous, are needed only for disinfection of the germs in fæces and urine from patients with such diseases as typhoid fever and poliomyelitis. Mercury perchloride (corrosive sublimate) 1–1,000 kills non-sporing organisms in thirty minutes; 1–500 solution kills sporing organisms in sixty minutes. It corrodes metals. Carbolic acid (phenol) and the cresols in dilutions of 1 in 20 kill non-sporing organisms in one hour. Bleaching powder (chlorinated lime), when fresh, contains 33 per cent available chlorine. Enough bleaching powder should be added to cover the excreta; water is added to make a 5 per cent solution. The whole is broken up by stirring, and allowed to stand for one hour. Many so-called “disinfectants” are only deodorants.

Disinfection of the Room and its Contents.—The vitality of micro-organisms outside the body varies. This depends on a variety of facts such as moisture, sunlight, and fresh air. Generally speaking, germs, once they have left the body, live a comparatively short time, especially if they are exposed to fresh air and sunlight. A room from which an infectious case has been removed should be vacated, stripped, and ventilated thoroughly. The floor should be scrubbed with soap and water. The mattress and pillows should be exposed to fresh air and the sunshine for 24 hours or, in cases of scabies, tinea, etc., should be sterilized by dry steam.

Disinfection of Convalescents.—This is best done by giving them a hot bath followed by a completely clean set of clothing, including a towel, new toothbrush, etc.

The Importance of Concurrent Disinfection of Attendants.—Nurses attending infectious cases may carry infection to other patients. The hands should be thoroughly washed after each contact with an infectious patient or clothing from the sick room. A mask should be worn if the nurse is in attendance on infections conveyed by transmissible droplets. A white gown, separate for each nurse, should be worn when attending infectious cases and then should be hung on a separate hook outside the sick room. Nurses must report immediately any sore throat or other symptoms they may contract to the medical officer, and be assured that they will not be thought to be making a fuss in so doing.

SECTION VI

DEFINITION OF TERMS

Carrier.—A person who, without symptoms of a communicable disease, harbours and is liable to disseminate the specific micro-organisms.

Communicable Period.—The period during which the etiological agent may be transferred directly or indirectly from the body of the infected person to the body of another person.

Contact.—A person known to have been sufficiently near an infected individual for transmission of the causal agent to have occurred.

Disinfection.—The destruction of the vitality of pathogenic micro-organisms by chemical or physical means. (See Section V.)

Droplet Infection.—The transmission of infectious agents by minute particles of discharges from the upper respiratory tract in the act of sneezing, coughing, laughing, and even talking.

Fumigation.—A process by which the destruction of insects, e.g. mosquitoes, body lice, and animals, e.g. rats, is attempted by the use of gaseous agents.

Immunes.—Persons known to be resistant to a particular communicable disease by the possession of an immunity. Immunity may be (1) natural; (2) acquired by a previous attack or a subclinical infection; (3) artificial—passive or active.

Incubation Period.—The time interval between the infection of a susceptible person and the appearance in him of symptoms of the disease.

Infection.—The entry and multiplication of the particular pathogen in the body in man or animal. The presence of living pathogenic organisms of fomites, water, sewage, milk, etc., is called "contamination" as opposed to infection.

Isolation.—The separation of infectious patients or carriers to prevent the direct or indirect transmission of the infectious agent to others.

Quarantine.—The limitation of movement of contacts for a period of time equal to the longest incubation period of the disease to which they have been exposed.

Subclinical or Subliminal Infection.—A person with a subliminal infection is one whom the infecting organism infects in so mild or atypical a manner that even though present the infection is unlikely to be recognized.

Surveillance.—The practice of observing contacts during the incubation period of the disease without imposing restrictions on their movements.

Susceptibles.—Persons who are presumed to be non-immune, i.e. liable to acquire the disease in question if exposed to the source of infection.

Suspect.—A person whose medical history and symptoms suggest that he may have, or be developing, some communicable disease.

SECTION VII

NOTIFICATION OF DISEASES

“Every medical practitioner attending on, or called in to visit, a patient shall, as soon as he becomes aware that the patient is suffering from a notifiable disease, send to the medical officer of health of the district in which the building is situated a certificate stating the name of the patient, the situation of the building, and the disease from which, *in the opinion of that medical practitioner*, the patient is suffering.” Public Health Act, 1936, para. 144b.

Forms of certificates are provided gratis by the local authority; and a fee for each certificate will be paid. Every medical man who, in the exercise of his professional duties (as a consultant or otherwise), sees and recognizes any case of the scheduled notifiable diseases, is, technically, bound to notify and can claim a fee for so doing. The sending in of the certificate is held by the Ministry of Health as constituting a legal claim for payment.

The following diseases are notifiable :—

Cholera, Diphtheria, Erysipelas, Scarlet Fever, Smallpox, Typhus, Typhoid (A and B), Relapsing Fever, Puerperal Fever, Acute Pneumonia (Primary and influenzal), Plague, Dysentery, Tuberculosis, Ophthalmia Neonatorum, Cerebro-spinal Fever, Acute Poliomyelitis, Acute Polio-encephalitis, Encephalitis Lethargica, Malaria, Measles, Whooping-cough. Food Poisoning, Epidemic Jaundice, Scabies, and Chicken Pox have been made temporarily notifiable by Regulation in certain areas.

SECTION VIII

COMMUNICABLE DISEASES

Acute Infectious Conjunctivitis (Pink Eye)

1. **Recognition of the Disease.**—A catarrhal inflammation of one or both eyes causing conjunctival injection, a variable amount of discharge, and little in the way of symptoms. The suffusion of the conjunctivæ varies from a slight pinkness to a marked redness. The sticky discharge, at first thin and slight, becomes thicker and mucopurulent, depending on the causal organism.

2. **Etiological Agent.**—One of several organisms, including Koch-Weeks bacillus, Morax-Axenfeld bacilli and pyogenic cocci.

3. **Source of Infection.**—Infected persons.

4. **Mode of Transmission.**—Contact with soiled handkerchiefs, etc., and droplet infection.

5. **Incubation Period.**—Uncertain, probably 24 to 48 hours.

6. **Period of Communicability.**—So long as there are signs of inflammation and organisms can still be cultivated.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—None.

8. **Prevalence.**—Often in epidemics.

9. **Methods of Control**—

A. The infected individual, contacts, and environment. Isolation of infected individuals, who because they are young or uncooperative, cannot be relied on not to transmit infection by fomites, etc.

(i) Recognition of disease.

(ii) Isolation of those who have extensive inflammation and those who are young. Others who can be relied upon to use their own toilet articles may continue to attend school.

(iii) Concurrent disinfection of conjunctival discharges and articles soiled by them.

(iv) Terminal disinfection. Unimportant if concurrent disinfection carried out.

(v) Quarantine. Nil.

(vi) Immunization. Nil.

(vii) Investigation of source of infection. Inspection of others in exposed community.

10. **Return to School.**—In young or uncooperative patients as soon as all discharge has ceased. In others, exclusion unnecessary if there is adequate medical and nursing supervision.

Brucellosis

(*Abortus Fever, Undulant Fever, Malta Fever, Mediterranean Fever*)

1. **Recognition of the Disease.**—The mild cases of abortus fever encountered in Britain are often ambulatory and of obscure symptomatology. General signs and symptoms of gradual onset and variable severity include pyrexia, headache, lassitude, depression, anorexia, constipation, and pains in joints and muscles. The more severe Mediterranean fever typically exhibits prolonged undulating pyrexia, chills, sweating, wasting, nervous manifestations, arthritis, constipation, rash on trunk, and splenomegaly. Confirmation of the diagnosis is provided by agglutination tests and the detection of the organism in the blood and urine.

2. **Etiological Agent.**—*Brucella melitensis* and *Brucella abortus*.

3. **Source of Infection.**—The milk, urine, blood, and tissues of infected animals, especially goats and cattle.

4. **Mode of Transmission.**—By the ingestion of infected milk; by contact with infected animals.

5. **Incubation Period.**—Six to thirty days, commonly fourteen days.

6. **Period of Communicability.**—Transmission from one human being to another hardly ever occurs. Organism may be present in urine for 30 to 200 days: usually 90 days.

7. (a) **Susceptibility.**—Always more subclinical than recognized attacks.

(b) **Immunity.**—Probable after one attack.

8. **Prevalence.**—Epidemics are liable to occur if there is a source for infection, e.g. infected herd, but many drinking the milk fail to develop the disease although for every declared case there are several who can be shown by blood tests to have been subclinically infected.

9. Methods of Control—

A. The infected individual, contacts, and environment.

- (i) Recognition of the disease. Clinical symptoms confirmed by specific agglutination tests, and bacteriological examination of the blood and urine.
- (ii) Isolation. None.
- (iii) Concurrent disinfection. Ordinary sanitary precautions.
- (iv) Terminal disinfection. None.
- (v) Quarantine. None.
- (vi) Immunization. Uncertain.
- (vii) Investigation of source of infection. Usually infected milk.

B. General Measures :—

- (i) Pasteurization of milk.
- (ii) Elimination from herds of infected animals discovered by agglutination tests.

10. **Return to School.**—As soon as the patient is sufficiently convalescent.

Cerobro-spinal Fever, Meningococcal Meningitis

1. **Recognition of the Disease.**—Typically the disease is a purulent meningitis of sudden onset with severe headache, vomiting, pyrexia, pain in the neck and back, irritability, photophobia, signs of muscular rigidity (neck stiffness and Kernig's signs), and, in a proportion of cases, a rash erythematous or petechial in type, which may be a presenting sign. Detection of the disease in the pre-meningeal septicæmic phase is more likely in epidemics. Septicæmic forms without meningeal involvement are common and vary from rapidly fatal fulminating infections to chronic forms with intermittent and relapsing pyrexia, pains in the limbs, and an eruption resembling erythema nodosum. Abortive forms usually take the form of upper respiratory catarrh. The detection of meningococci by blood culture or in a spinal fluid exhibiting evidence of a purulent meningitis confirms the diagnosis.

2. **Etiological Agent.**—*Neisseria meningitidis* (meningococcus).

3. **Source of Infection.**—Discharges from the nose and mouth of infectious persons. Healthy persons who have never had the disease but have been in contact with cases of the disease or other carriers, may act as carriers, especially during epidemics. Such healthy carriers are not uncommonly found independent of epidemic prevalence of the disease.

4. **Mode of Transmission.**—By droplet spread from infected persons and carriers and indirectly by contact with articles freshly soiled with the nasal and mouth discharges of such persons.

5. **Incubation Period.**—Uncertain. Probably one or two days.

6. **Period of Communicability.**—So long as the infecting organisms can be recovered from nasopharynx of patient or carrier. Three negative swabs at intervals of two days should be obtained.

7. **Susceptibility and Immunity.**—Unknown.

8. **Prevalence.**—Especially among young people when there is overcrowding in sleeping or recreation quarters during autumn and winter months.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

- (i) Recognition of the disease.
- (ii) Isolation of declared cases and carriers.

- (iii) Concurrent disinfection of discharges and articles soiled by them.
- (iv) Terminal disinfection. Thorough cleaning of sick-room.
- (v) Quarantine. Nil, but surveillance of exposed individuals necessary.
- (vi) Immunization. None.
- (vii) Investigation of source of infection. Detection of carriers is difficult but may be necessary.

B. General measures. The prevention of overcrowding is essential.

10. **Return to School.**—The declared case and the carrier should be excluded during period of communicability and until complete recovery has occurred.

Chicken Pox (Varicella)

1. **Recognition of the Disease.**—A mild, highly infectious disease characterized by a typical rash and slight constitutional disturbance. The rash is distributed centripetally : it is most profuse on the trunk, face, and scalp, and is least evident or absent on the peripheral parts of the extremities. Flexures are involved. Sparse rashes are common. Superficial papules quickly pass through vesicular and pustular stages to form crusts, and, as successive crops undergo their rapid evolution, the rash is pleomorphic. Vesiculo-ulcerative lesions in the mouth common appear early, but are sparse.

2. **Etiological Agent.**—A filterable virus.

3. **Source of Infection.**—The lesions of the mucous membrane, and the skin. The vesicles in the mucous membrane appear early, rupture as soon as they appear, and so render the disease communicable early, that is, before the exanthem is in evidence. Some cases of herpes zoster may be a source of infection.

4. **Mode of Transmission.**—By droplet spread, and directly from person to person. Indirectly through articles freshly soiled by discharges from an infected person. The mode of transmission from those with herpes zoster is probably by droplet spread.

5. **Incubation Period.**—Eleven to nineteen days.

6. **Period of Communicability.**—Probably seldom more than one day before and five days after the appearance of the eruption. Certainly the limit is the disappearance of scabs on the skin and mucous membrane, and healing of the lesions.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—One attack confers permanent immunity, with rare exceptions.

8. **Prevalence.**—Universal.

9. **Methods of Control—**

A. The infected individual, contacts, and environment.

- (i) Recognition of the disease. Clinical symptoms. The chief public health importance of this disease is that cases thought to be chicken pox in persons over 15 years of age, or at any age during an epidemic of smallpox, are to be investigated to eliminate the possibility.
- (ii) Isolation. Exclusion of patients from school until every primary scab has fallen off and the skin lesions have healed, particular attention being paid to the scalp.
- (iii) Concurrent disinfection. Articles soiled by discharges from lesions.
- (iv) Terminal disinfection. Thorough cleansing.
- (v) Quarantine. None.
- (vi) Immunization. None.
- (vii) Investigation of source of infection. Unimportant.

B. General measures. None.

10. **Return to School.**—At the end of isolation.

Common Cold

1. **Recognition of the Disease.**—A highly infectious, acute, febrile, upper respiratory catarrh lasting about two to seven days, usually accompanied by mild constitutional disturbance. Malaise, chilly sensations, aching pains, and pyrexia are accompanied by sneezing, nasal congestion, rhinorrhœa, conjunctival suffusion, and lacrymation. Subsequently the nasal discharge becomes mucopurulent due to secondary bacterial organisms. Spread to lower parts of the respiratory tract and to the middle ear is not uncommon.

2. **Etiological Agent.**—Probably a filterable virus complicated by disproportionate growth of some of the normal nasal flora.

3. **Source of Infection.**—Discharges from upper respiratory tract of infected persons.

4. **Mode of Transmission.**—By droplets of catarrhal discharges and by direct contact with infected articles, enhanced by faulty ventilation, and by other factors which may act by lowering the resistance of the exposed individual.

5. **Incubation Period.**—Probably 12–48 hours.

6. **Period of Communicability.**—Variable. In all types of “cold” the infectivity is more marked in the early stage of the catarrh.

7. **Susceptibility and Immunity.**—Not known.

8. **Prevalence.**—Very prevalent. Becomes less from 15 years of age upwards.

9. **Methods of Control—**

A. The infected individual, contacts, and environment.

- (i) Recognition of the disease.
- (ii) Isolation. From earliest recognized stage.
- (iii) Concurrent disinfection. Of all discharges and articles soiled by them. Paper handkerchiefs are desirable at the acute stage.
- (iv) Terminal disinfection. Minimal if (iii) is efficient.
- (v) Quarantine. None.
- (vi) Immunization. None.
- (vii) Investigation of source of infection. Usually impossible.

B. General Measures. Attention to general and personal hygiene, extra food, and anything which will keep up the individual resistance.

10. **Return to School.**—As soon as the catarrhal stage is over and so long as the patient is really fit to take part in full school life.

Diphtheria

1. **Recognition of the Disease.**—An acute febrile infection, chiefly of the upper air passages, resulting in the formation of one or more patches of adherent membrane at the site of implantation of the bacillus, and the production there of a powerful exotoxin which damages the myocardium and causes paralysis. The site of the membrane determines the form of the disease: fauces (tonsils), pharynx, nose, and larynx are involved singly or in combination: non-respiratory forms, e.g. cutaneous, occur infrequently. Except in the now rare laryngeal diphtheria which causes mechanical obstruction of the air passages, the danger from diphtheria depends on the toxæmia, which varies with the extent of the membrane and its site. Pharyngeal diphtheria is the most dangerous and anterior nasal the least. Infections due to gravis strains are usually more severe than those due to intermedius strains and definitely graver than mitis infection, except when mitis strains cause laryngeal obstruction.

Pyrexia is not a prominent sign of diphtheria. In the anterior nasal form a blood-stained nasal discharge, often unilateral, is the common presenting symptom. In the faucial and pharyngeal forms sore throat may not be pronounced, but constitutional symptoms such as malaise, headache, vomiting, moderate pyrexia and a variable degree of weakness are usual: cervical adenitis and periadenitis appear in the sharper attacks. Bacteriological confirmation consists in detection of the bacillus in discharges or membrane. Further information is obtained by typing the organism or testing its virulence. Schick testing has a limited use. Diphtheria can occur in the immunized if the attacking strain of the bacillus is particularly virulent (usually a gravis strain), or if immunity is low, either because it has lapsed

or was never adequate. Its incidence is much less than in the unimmunized. Diphtheria in the immunized is usually a mild disease, but takes the same clinical form as in the unimmunized and even fatal infections may occur.

2. **Etiological Agent.**—Diphtheria bacillus, *Corynebacterium diphtheria*. Three definite types and many sub-types now recognized—the mitis, intermedius, and gravis. The first is usually associated with the laryngeal type, the last with the toxic type of disease. Non-toxic or avirulent types of all three recognized especially in discharges from the ear.

3. **Source of Infection.**—Discharges from diphtheritic lesions of nose, throat, ear, conjunctiva, vagina, and surface wounds. Secretions from the nasopharynx of carriers of the disease.

4. **Mode of Transmission.**—By droplet spread: directly by personal contact, indirectly by articles freshly soiled with discharges, by fomites, such as pencils and spoons, or through contaminated milk or milk products.

5. **Incubation Period.**—Usually two to five days, with limits of one to seven days.

6. **Period of Communicability.**—Until virulent bacilli have disappeared from the lesions and the secretions. The persistence of the bacilli after the lesions have healed is variable. In three-quarters of the cases they disappear in four weeks. In exceptional cases virulent bacilli remain in the throat and/or nose for many months. The property of persistent carriage depends on the unhealthy condition of the mucous membranes, the tonsils, and even on the presence of foreign bodies in the nose.

7. (a) **Susceptibility.**—Varies greatly with age. A child is most susceptible from three to seven years.

(b) **Immunity.**—During his early years he may develop an immunity either by exposure to subliminal infection derived from associates, from actual infection, or by artificial immunization. If early exposure has not occurred later subclinical infection may produce immunity. A temporary immunity, lasting from ten days to three weeks, may be provided by the administration of antitoxin and is justifiably given in some instances to those persons exposed to infection. One attack may confer permanent immunity, but active immunization, especially in children treated with antitoxin, should be performed.

8. **Prevalence.**—Endemic in Great Britain—cyclical periods of rise and fall occur every five to seven years: may become epidemic under certain circumstances, especially with the appearance of a new virulent type of germ. The incidence is highest among unimmunized children starting school. Epidemics can be prevented by mass immunization of the susceptible community. Infection in immunized children are known, but the disease is generally mild.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

(i) *Recognition of the disease.*

- (a) Search should be made for cases not showing typical symptoms.
- (b) Bacteriological confirmation of all cases is required, but administration of antitoxin should not be postponed until the laboratory examination has been confirmed, as valuable time may be lost in neutralizing the toxin before it is fixed to the nerve cells.

(ii) *Isolation.* Until there is no longer any sore throat, or any discharge from the throat, nose, ears, eyes, or vagina, and *no* cutaneous pustulations: and until at least two successful bacteriological examinations of the pharyngeal and nasal mucus for the specific bacillus, made at an interval of not less than 24 hours, have been negative, each examination having been made not less than six hours after the discontinuance of local antiseptic application. It is advisable to test for the virulence of the germ in persistent carriers. A similar rule applies to every nurse who has been attending a case of diphtheria, and a like procedure should be followed before she resumes her ordinary duties.

(iii) *Concurrent disinfection* of all articles which have been in contact with the patient, and those soiled by discharges from the patient.

(iv) *Terminal disinfection.* At the end of the illness thorough cleaning followed by airing and sunning of the sick room and contents. This is an appropriate time to carry out periodical renovations.

(v) *Quarantine.* None, but surveillance of suspected contacts.

(vi) *Immunization.* It is generally held that a person who carries $1/250$ unit of diphtheria antitoxin in 1 c.c. of his blood will not contract the disease. Schick's test is negative on this basis. A Schick negative child, however, may contract the disease if exposed to massed infection in an epidemic: or if a new type of micro-organism (a rogue) appears, as often happens in epidemics. This case can only be prevented by improving the immunity of the person and of the affected group as a whole.

Active immunization is produced by injecting into the muscle tissue of the child a measured quantity of

antigen, i.e. modified diphtheria toxin, the presence of which in the system educates the tissues to produce antitoxin. Three antigens are now in general use: Formol toxoid (F.T.), Toxoid antitoxin floccules (T.A.F.), and alum precipitated toxoid (A.P.T.).

A.P.T. is now held to be the most effective immunizing agent. The best results are obtained by using a large dose of the antigen as the primary stimulus, and following this after four to six weeks with a second dose. It does not matter how small this second dose is, but as it is difficult to measure small doses accurately, and as a large dose is more lasting, it is suggested that both doses should be 0.5 c.c. of A.P.T. antigen. If the child has had its primary immunization in early life, i.e. before its first birthday, it is advisable to provide an invigorating dose of 0.2 c.c. A.P.T. or 1 c.c. T.A.F. at two to three years, and certainly another when the child goes to school at five, when it is exposed to greater risks of infection. In general this treatment provides the individual with effective and lasting immunity, though there are some who recommend a final dose of antigen in later life—between seven and fourteen years.

If there is an outbreak of diphtheria in a school it is good practice to provide each immunized child with a further invigorating dose, as this increases the titre of antitoxin in one or two days' time. This supersedes passive immunization. Children who have recently recovered from an attack of the disease, more especially in those who had received passive immunization early in the disease, should be actively immunized as soon as possible after recovery from the disease.

- (vii) *Investigation of source of infection.* Clinical examination for missed cases, and for those with some unhealthy condition of the nose, throat, ears, or skin. Such cases should be swabbed for the presence of virulent *Corynebacterium diphtheria*, Schick tested, and actively immunized if they give a positive reaction. The carrier may be considered innocuous and freed from quarantine if the micro-organism found is non-virulent to guinea-pigs.

B. General Measures :—

- (i) All children should be actively immunized against diphtheria. If immunized during infancy, children should receive a single reinvigorating dose of the antigen at varying times, but certainly on entrance to school.

- (ii) Older children, and adults especially exposed, such as nurses, teachers, physicians, should receive a reinvigorating dose.
- (iii) Pasteurization of the milk supply.
- (iv) Educational measures to inform the public of the advantages of active immunization.

10. **Return to School.**—The patient must have fully recovered and satisfied the conditions laid down for release from isolation.

Dysentery (Bacillary)

1. **Recognition of the Disease.**—An acute colitis or ileo-colitis causing diarrhoea with the passage of frequent, small, fluid stools containing blood and mucus. Defecation is accompanied by colic and rectal discomfort. A correlation exists between the type of bacillus and the severity of symptoms: Sonne infections are usually mild and blood and mucus may be absent from the stools. Bacteriological examination of a rectal swab or of the stools commonly reveals the causal agent.

2. **Etiological Agent.**—Dysentery bacilli, particularly Sonne and Flexner strains in this country.

3. **Source of Infection.**—Bowel discharges of infected individuals. Healthy carriers may occur.

4. **Mode of Transmission.**—By the ingestion of contaminated milk or food; from objects soiled with excreta; by flies. Contaminated water is not a common mode. Infected portable baths have been implicated.

5. **Incubation Period.**—From one to seven days.

6. **Period of Communicability.**—From the onset of the disease until the discharges are free from organisms: usually a few days only; sometimes weeks or months in convalescent carriers.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—Uncertain.

8. **Prevalence.**—Epidemics liable to occur in any community if there is a source of infection.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

- (i) *Recognition of the Disease.* Clinical symptoms, i.e. diarrhoea, especially with blood and mucus, confirmed by bacteriological examination of the bowel discharges. Abortive cases and carriers should be sought. Bacteriological confirmation should be obtained. Serological examinations are less dependable in Sonne infections than in Flexner infections.

(ii) *Isolation.* Barrier nursing or separate cell if the nursing

technique is dependable, otherwise under hospital conditions. Release from isolation after the cessation of symptoms should be determined by two successive negative cultures of the stools, collected not less than 24 hours apart.

- (iii) *Concurrent disinfection.* All bowel discharges and articles soiled by them. Special facilities should be provided so that the patient can wash after his bowels have been open. Disinfection of baths after use by those affected in outbreaks of the disease.
- (iv) *Terminal disinfection.* Cleaning.
- (v) *Quarantine.* None.
- (vi) *Immunization of Contacts.* Efficient antigens for the prevalent types of dysentery are not available.
- (vii) *Investigation of source of infection.* Clinical and bacteriological examination of contacts to detect carriers. (See under Food Poisoning.)

B. General Measures :—

- (i) Exclusion of suspected milk, water, or other articles from diet pending the discovery of the infected person or other cause of contamination.
- (ii) Protection and purification of public water supplies and cisterns, and prevention of subsequent contamination.
- (iii) Pasteurization of public milk supplies : boiling of milk if its purity is in question.
- (iv) Supervision of the preparation and handling of food.
- (v) Hand washing after the use of the toilet, particularly by food handlers.
- (vi) Prevention of fly-breeding : screening.
- (vii) Sanitary disposal of human excreta.
- (viii) Supervision of carriers and their exclusion from handling food or working in public waterworks.

10. **Return to School.** At the end of isolation if patient has recovered.

The Enteric Fever Group

(Including Typhoid Fever. Paratyphoid A and B)

1. **Recognition of the Disease.**—A systematic infection with involvement of lymphoid tissues (especially involvement and often ulceration of Peyer's patches), and parenchymatous involvement of various viscera causing a variety of constitutional disturbances. Characteristically continued pyrexia of gradual onset is associated with varying degrees of toxæmia, splenomegaly, cough, intestinal upset, and a rash about the end of the first week comprising sparse

crops of lenticular rose spots on the trunk. Diarrhœa is more common in the severe cases, the khaki-coloured fluid stools resembling pea-soup. Constipation is more frequent in mild attacks. Paratyphoid fever is usually milder than typhoid and, in young children particularly, may take the form of an acute gastro-enteritis. The causal organism can be recovered from the blood, fæces, and urine. After the first week or so the blood shows a rising titre of agglutinins.

2. **Etiological Agent.**—Typhoid bacillus (*Eberthella typhi*), paratyphoid bacillus A or B. A variety of species, each specific to the outbreak, may be identified in pure culture by the use of specific *phages*. Cases, although widely distributed, may be traced to the same source by this means.

3. **Source of Infection.**—Bowel discharges and urine of infected individual and carriers. About 2 to 5 per cent of patients become permanent or intermittent carriers. Contacts may also be transient carriers.

4. **Mode of Transmission.**—Conveyance of the specific organism by direct or indirect contact with the source of infection. Among indirect means of transmission are contaminated water, milk, ice creams, and shell fish. Contaminated flies have been common means of transmission of epidemics.

5. **Incubation Period.**—From 3 to 38 days—usually 7 to 14 days.

6. **Period of Communicability.**—From the appearance of prodromal symptoms, throughout the illness and relapses during convalescence, and until repeated bacteriological examinations of the discharges show persistent absence of the infecting organism. Carriers should be treated as infected persons.

7. (a) **Susceptibility.**—Is general, though many adults acquire immunity through unrecognized infections.

(b) **Immunity.**—An acquired immunity of permanent duration usually follows recovery. Artificial active immunity of probably two years' duration can be developed by inoculation with a combined vaccine (T.A.B.) of high potency. Protection persists for one year at a high level and can be maintained by re-immunization.

8. **Prevalence.**—Formerly widespread throughout the world. Now an endemic disease usually occurring as sporadic cases often difficult to detect. Incidence has been falling owing to improved sanitary conditions, such as sewage disposal and purification, safe water supplies, milk pasteurization, elimination of flies, etc.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

(i) *Recognition of the disease.* Clinical symptoms confirmed by blood culture, specific agglutination tests, and bacteriological examination of alvine discharges. The

bacilli can be isolated from the blood, the fæces or urine of the patient in the early stages of the disease.

- (a) Ambulant and missed cases and particularly carriers should be sought.
- (b) Bacteriological investigations of these are most important.
- (ii) *Isolation.* Preferably under hospital and strict nursing conditions. Release from isolation should be determined by two successive negative cultures from specimens of stools and urine collected not less than twenty-four hours apart.
- (iii) *Concurrent disinfection.* Disinfection of all bowel and urinary discharges and all articles soiled with them or have come in contact with the patient.
- (iv) *Terminal disinfection.* Thorough cleaning of room and all articles in the room.
- (v) *Quarantine.* None, but supervision of contacts necessary.
- (vi) *Immunization.* By T.A.B. vaccine of susceptibles and of those in the patient's household who have been exposed, or may be exposed at some time during the course of the disease. Those living in countries where typhoid is common are special candidates for artificial immunization. Several weeks will elapse between the injection of the vaccine and the development of a high degree of immunity.
- (vii) *Investigation of source of infection.* A search for common or individual sources of every case should be made. Unnotified cases and carriers should be sought. Contaminated food, water, milk, shellfish should be suspected. The species of the bacilli should be isolated in each case by typing against specific phages.

B. General Measures :—

- (i) Protection and purification of public water supplies.
- (ii) Modernizing and frequent inspection of sanitary installation. Providing separate cisterns for drinking water supply. These need frequent cleansing and lime washing externally.
- (iii) Sanitary disposal of human excreta.
- (iv) Pasteurization of milk supply.
- (v) Supervision of other food supplies and of food handlers.
- (vi) Prevention of fly breeding.
- (vii) Extension of immunization by T.A.B. vaccine as far as

practicable in communities where the disease is prevalent, and those for whom immunization can be systematically and economically applied, as in military forces and institutional populations.

- (viii) Supervision of typhoid carriers and their exclusion from the handling of foods.
- (ix) Systematic examination of faecal specimens from those who have been in contact with recognized cases to detect carriers.
- (x) Persons who contemplate travelling should be protected by T.A.B. vaccine.
- (xi) Exclusion of suspected milk supplies pending the discovery of the person or other cause of contamination, or in any case the pasteurization of all milk for supply before consumption.
- (xii) Exclusion of water supply, if suspected of contamination, until adequately treated with chlorine or one of its compounds, unless all water used for toilet, cooking, drinking, or washing purposes is boiled before use.

C. Epidemic Measures :—

- (i) Exclusion of milk supplies suspected on epidemiological evidence pending discovery, and elimination of the cause of contamination of the milk. Alternatively, if this cannot be done, all milk must be pasteurized before use.
- (ii) Exclusion of suspected water supply, until adequate protection or purification is provided, unless all water used for toilet, cooking, and drinking purposes is boiled before use.
- (iii) Control of fly breeding and dust in connection with the disposal of the alvine discharges in the field.
- (iv) Education of the public, and particularly of food handlers, concerning the sources of infection and modes of transmission.
- (v) Provision of adequate washing arrangements—including hot water, soap, and towels for those handling food in kitchens, stores, and dining rooms.

10. **Return to School.**—A pupil who has had the disease is unlikely to be fit for school life until long after any possible danger of infection from him is passed.

Epidemic Encephalitis

1. **Recognition of the Disease.**—There are many varieties of encephalitis, some of which, such as encephalitis lethargica, occur in epidemics reproducing similar cases in a particular outbreak, whereas other forms occur as rare manifestations in an epidemic of other

diseases, e.g. mumps, measles, chicken pox, vaccinia, etc. In encephalitis lethargica (Vienna form) there is a mild febrile onset, with headache, restlessness, irritability or drowsiness, changes in sleep rhythm, disorientation, and in the severest cases stupor and coma. Paresis may occur, particularly of the ocular muscles causing diplopia. Bladder control may be lost.

In the forms complicating an infectious disease such as mumps, rubella, etc., there are characteristic constitutional symptoms, disturbances of the sensorium, and signs of disseminated lesions in the central nervous system. Simple laboratory tests, though they may confirm the diagnosis of encephalitis, do not aid in determining the virus responsible. Epidemiological evidence may incriminate the virus of chicken pox, mumps, measles, rubella, vaccinia, glandular fever, or possibly benign lymphocytic meningitis or other rarer diseases.

2. **Etiological Agent.**—Probably one of several strains of virus.

3. **Source of Infection.**—Probably discharges from the nose and throat of infected persons. There may be healthy carriers during prevalence of the disease.

4. **Mode of Transmission.**—Probably by droplet spread and contact with an infected person or a carrier of the virus.

5. **Incubation Period.**—Undetermined. Believed to be 2–14 days.

6. **Period of Communicability.**—Probably during the febrile stage of the disease.

7. **Susceptibility and Immunity.**—Unknown.

8. **Prevalence.**—Rare, except for outbreaks of some severity which have occurred in many parts of the world.

9. **Methods of Control.**—A notifiable disease. Isolation as soon as diagnosis can be made.

10. **Return to School.**—No patient is likely to return to school while carrying infection as the convalescence will be a long one.

Food Infections

1. **Recognition of the Disease.**—A group of diseases caused by organisms or their toxins in food or drink, characterized by diarrhoea, nausea or vomiting, abdominal cramps, prostration of variable degree and, less consistently, pyrexia, headache, faintness, and thirst. (Specific infections such as enteric fever, dysentery, and brucellosis are excluded, as is poisoning by chemical irritants.) An abrupt onset within a few hours of ingestion of the contaminated foodstuff suggests an intoxication rather than an infection. Botulism exhibits a special syndrome due to a neurotoxin: vomiting, obstinate constipation, and, later, cranial nerve palsies causing diplopia, dysarthria, dysphagia, and dyspnoea.

2. **Etiological Agent.**—Diseases fall roughly into three categories : Bacterial food poisoning, most commonly due to an organism of the salmonella group, of which there are many varieties. Bacterial intoxications :—

- (i) *Enterotoxic.*—A heat stable exotoxin from staphylococci is a common cause.
- (ii) *Botulism* which is due to a soluble neurotoxin produced by *Clostridium botulinum*.

3. **Source of Infection.**—Usually bowel discharges of infected individuals or carriers of bacterial food poisoning. Sometimes animal sources, e.g. droppings from rodents, contaminated meat, ducks' eggs, dried egg. Of bacterial intoxications :—

- (i) Skin lesions and nasal or sinus infections in food handlers.
- (ii) Imperfectly processed canned or bottled foods.

4. **Mode of Infection.**—By ingestion of contaminated food or drink.

5. **Incubation Period.**—Of bacterial food poisoning, 6–48 hours. Usually about 24 hours. Of bacterial intoxications :—

- (i) Within 4 hours.
- (ii) Within 24 hours.

6. **Period of Communicability.**—In case of bacterial infections, until the stools are free from infecting organisms.

- 7. (a) **Susceptibility.**—General.
- (b) **Immunity.**—Not known.

8. **Prevalence.**—Variable, but certainly proportional to lack of hygiene.

9. **Methods of Control**—

A. The infected individual and his environment.

- (i) *Recognition of the disease* by clinical symptoms and the type of outbreak. Confirmation sometimes possible from bacteriological and chemical examination of bowel discharges and vomitus and food responsible.
- (ii) *Isolation* until clinical recovery. If the organism is known, release should be determined by two negative cultures of stools collected at an interval of not less than 24 hours.
- (iii) *Immunization.* None.
- (iv) *Quarantine.* None.
- (v) *Concurrent disinfection* of bowel discharges, vomitus, and articles soiled by them.
- (vi) *Terminal disinfection.* Cleaning.

- (vii) *Investigation of the source.* Exclusion of suspected food. Medical and bacteriological examination of food handlers for source of infection in bowel, skin, etc.

B. General Measures :—

- (i) Supervision of the preparation and handling of food. Adequate heat treatment of certain foods.
- (ii) A condition of employment of food handlers in schools should be that they report illnesses to the medical officer.
- (iii) Hand washing after the use of the toilet. Special attention to skin lesions and nasal discharges in food handlers.
- (iv) Prevention of fly breeding and extermination of rodents.
- (v) Measures to ensure clean water and milk supplies.
- (vi) Pasteurization of milk.
- (vii) Use of domestic refrigerators for storage of food and milk. Reduction in interval between preparation and consumption of certain foods, e.g. custards, trifles, etc.

10. Return to School.—As soon as the patient is fit for school life provided two stools, taken at interval of 24 hours, are free from infecting agent.

Glandular Fever (Infective Mononucleosis)

1. Recognition of the Disease.—An acute febrile infection in which the clinical syndrome varies with the form of the disease—glandular, anginose, or febrile. Constitutional disturbance varies from moderate to mild. The onset is usually acute with malaise, headache, pyrexia, and sometimes sore throat. Glandular enlargement is typically cervical, but may be mesenteric or tracheo-bronchial. It is evident towards the end of the first week and is non-suppurative. Splenomegaly is common. A rash of variable morphology, but sometimes resembling the rose spots of enteric fever, occur in a small proportion of cases between the fourth and tenth day. Urticaria, macular, and papular eruptions of a morbilliform nature also occur. Jaundice and meningo-encephalitis are sometimes seen. Glandular swelling and pyrexia may persist for a month or more. There is a characteristic blood picture—absolute lymphocytosis and mononucleosis—and serological confirmation is provided after the first week by a positive, heterophile agglutination test on sheep's red cells (Paul Bunnell test).

2. Etiological Agent.—Probably filterable virus.

3. Source of Infection.—Secretions or discharges from the nose, throat, and possibly faeces of infected person. Mild unsuspected cases are probably a widespread source of infection.

4. **Mode of Transmission.**—Unknown.
5. **Incubation Period.**—Five to fourteen days, exceptionally twenty-one days.
6. **Period of Communicability.**—Uncertain.
7. (a) **Susceptibility.**—Susceptibility apparently general, but greatest among children and young adults.
 (b) **Immunity.**—The degree of immunity conferred by an attack is undetermined.
8. **Prevalence.**—Widespread, both as isolated cases and in epidemics. Many mild cases are not diagnosed.
9. **Methods of Control**—
 - (i) *Recognition of the disease.* Clinical symptoms, confirmed by examination of blood smears and, when possible, tests for heterophile antibodies.
 - (ii) *Isolation* of the infected person is necessary.
 - (iii) *Concurrent disinfection.* Special measures beyond ordinary hospital routine are unnecessary.
 - (iv) *Terminal disinfection*, by cleaning, fresh air, and sunlight.
 - (v) *Quarantine.* None.
 - (vi) *Immunization.* None.
 - (vii) *Investigation of source of infection* should be undertaken, especially during epidemics, with the hope of adding to knowledge of disease.
10. **Return to School.**—Determined by the clinical course.

Impetigo Contagiosa

1. **Recognition of the Disease.**—A superficial infection of the skin initially causing vesicles or bullæ which soon become typical, golden-yellow crusts. The face and hands are characteristically affected, but the lesions may occur anywhere. Impetigo may obscure or divert attention from an underlying primary skin condition like pediculosis capitis or scabies.
2. **Etiological Agent.**—*Streptococcus pyogenes*—*Staphylococcus Aureus* may be a primary or secondary infecting organism.
3. **Source of Infection.**—Infected persons or infected toilet articles. The infected person may have been carrying the streptococcus, etc., in his skin and less rarely in his throat, nose, or possibly ear.
4. **Mode of Transmission.**—Directly by contact with infected material or indirectly by contact with infected fomites. Auto-inoculation from one area to another may occur through scratching, etc.

5. **Incubation Period.**—Variable but short, commonly two days.
6. **Period of Communicability.**—While lesions remain unhealed.
7. (a) **Susceptibility.**—General.
(b) **Immunity.**—Unknown.
8. **Prevalence.**—Widespread: is a common complication of scabies and of pediculosis.
9. **Methods of Control**—
 - A. The infected individual, contacts, and environment.
 - (i) *Recognition of the disease.*
 - (ii) *Isolation.* All children with impetigo who cannot because of age or ignorance be relied to observe rules of hygiene should be isolated. Others who will scrupulously observe rules can attend school, but even these may need isolation because of the large surface involved or the weepingness of the lesions.
 - (iii) *Concurrent disinfection.* All contaminated dressings must be destroyed. All infected fomites should be sterilized before being laundered. Toilet articles if infected must be sterilized.
 - (iv) *Terminal disinfection.* Minimal if concurrent disinfection thorough.
 - (v) *Quarantine.* None.
 - (vi) *Immunization.* None.
 - (vii) *Investigation of source of infection.* An epidemic will demand this. All attendants with unhealed skin lesions are suspect.
 - B. General Measures :—
 - (i) A high standard of cleanliness is a safeguard. Communal toilet articles are a danger.

10. **Return to School.**—When lesions have ceased to appear and the sites of infection are healed. For those of riper years isolation is unnecessary if the patient will refrain from using any but his own toilet articles and clothes, etc.

Influenza

1. **Recognition of the Disease.**—A highly infectious acute febrile disorder characterized by constitutional disturbance, with or without symptoms referable to specific systems like the respiratory and intestinal tracts. Characteristically, the onset is sudden with headache, shivering, aches and pains in the back and limbs; prostration and pyrexia of several days' duration. Upper respiratory symptoms like coryza,

sore throat, and bronchitis are common, and pneumonia may supervene. Laboratory aids to diagnosis are not yet routine.

2. **Etiological Agent.**—Two viruses, A and B, are already known and there may be others.

3. **Source of Infection.**—Secretions and discharges from nose and throat of infected persons. Also occasionally from similar discharges from infected animals, e.g. ferrets, etc. From articles freshly soiled with discharges, e.g. handkerchiefs.

4. **Mode of Transmission.**—By droplets or by freshly infected fomites.

5. **Incubation Period.**—Probably 12–48 hours.

6. **Period of Communicability.**—Not certain. Probably not after temperature has become normal, but certainly before the onset of clinical symptoms.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—There seems to be little or no immunity for any length of time after an attack. Certainly an attack of virus A influenza gives no immunity against virus B, and vice versa. Artificial immunity following vaccines is at present of uncertain value.

8. **Prevalence.**—This is most variable, attacking a very high proportion of those exposed in severe epidemics. Virus A usually attacks larger numbers than virus B.

9. **Methods of Control.**—Generally once an epidemic gets a foothold in the closed community of a school, no control is possible. All steps that increase the general resistance of the community should be taken.

10. **Return to School.**—Will depend upon the severity of the symptoms and the clinical condition of the patient. Early resumption of active exercise within two weeks of the febrile condition may be dangerous, especially if there has been tachycardia during convalescence.

Jaundice

1. **Recognition of the Disease.**—In (a) *Infective hepatitis* a sub-acute onset of constitutional and gastro-intestinal symptoms is followed more or less insidiously by jaundice, usually of a benign type lasting days or weeks. In the pre-icteric phase general malaise, headache, anorexia, nausea, vomiting, and abdominal pain are usual. Pyrexia is usual, but not pronounced. Hæmorrhages, particularly from the stomach, may occur if severe liver failure results. Non-icteric cases are commoner than is usually supposed. Bile is present in the urine. The van den Bergh and liver function tests may assist differentiation from obstructive jaundice.

(b) *Homologous serum jaundice* is an analogous infection following intravenous or parenteral injections of blood or its products.

(c) *Weil's disease* (leptospiral jaundice) is a graver form of jaundice, chiefly occupational. A febrile disturbance is followed by a hepatorenal syndrome in which muscular pains, conjunctival injection, jaundice, albuminuria, petechiæ, or other hæmorrhagic phenomena and a polymorpho-nuclear leucocytosis are the essential features. *Leptospira* are recoverable from blood and urine and serological confirmation is possible after the first week.

Non-icteric cases are common.

2. **Etiological Agent—**

(a) Infectious hepatitis. A filter passing agent, probably a virus.

(b) *Homologous serum jaundice*. A filter passing agent, similar but probably not identical with (a).

(c) *Weil's disease* is due to *leptospira icterohæmorrhagica*.

3. **Source of Infection—**

(a) Nasal discharges and possibly urine and fæces of infected humans.

(b) *Homologous serum jaundice*. Blood or serum of carriers of icterogenic factor.

(c) Urine of some animals, particularly wild rats and rodents in infested streams.

4. **Mode of Transmission—**

(a) Generally contact, probably droplet. Possibly ingestion of infected drinking water or food.

(b) *Homologous serum jaundice*. Blood transfusions or therapeutic injection (e.g. measles convalescent serum is the classical example). Imperfect sterilization of needles and syringes between injections into a series of persons.

(c) *Weil's disease*. In school children usually immersion in rat infested water.

5. **Incubation Period—**

(a) 20 to 40 days, usually about 30 days.

(b) 30 to 120 days, usually 60 to 90 days.

(c) 4 to 19 days. Average 9 or 10 days.

6. **Period of Communicability—**

(a) Duration unknown, probably infectious before jaundice appears and for few days after.

(b) Rarely communicable except by parenteral injection of blood. Blood infectious before jaundice appears and for some weeks after.

(c) So long as spirochætes remains in urine.

7. (a) **Susceptibility.**(b) **Immunity.**8. **Prevalence.**9. **Methods of Control—**

A. The infected individual, contacts, and environment.

(i) *Recognition of disease.*

(a) and (b) Insidious onset with pre-icteric phase featuring anorexia. Hæmorrhages, particularly from stomach, may occur if severe liver failure results. Van den Bergh and liver function tests may assist differentiation from obstructive jaundice.

(c) Weil's disease. Illness characterized by continued fever sometimes with petechiæ and other hæmorrhagic phenomena. Spirochæte recoverable from blood and urine. Specific serological test.

(ii) *Isolation.*

(a) Desirable for one week from onset of jaundice (bed rest should continue until appetite restored).

(b) None.

(c) Desirable until urine free from infection.

(iii) *Concurrent disinfection.*

(a), (b), and (c) Urine and other discharges.

(iv) *Terminal disinfection.* None.(v) *Quarantine.* None.(vi) *Immunization.* None.(vii) *Investigation of source of infection.*

(a) If outbreak explosive review possibility of contamination of drinking water or food. Otherwise unprofitable.

(c) Search for rats harbouring leptospiræ and for food and bathing places to which they have access.

B. **General Measures :—**

(a) Treat all jaundice as communicable until proved otherwise and attempt to diagnose and isolate during pre-icteric phase. Teach hand washing after using toilet, particularly to food handlers.

(b) Sterilization of needles and syringes between patients. Record identity and batch numbers of prophylactic or therapeutic agents containing blood products. Report case to blood transfusion officer.

(c) Rat control. Proper garbage disposal and storage of food. Forbid bathing in rat infested streams.

10. **Return to School.**—(a), (b), (c). Until convalescence is complete, the best criterion being that the patient has regained his usual weight.

Measles

1. **Recognition of the Disease.**—During a highly infectious, prodromal, catarrhal stage Koplik's spots appear on the buccal mucosa and a typical rash follows about the fourth day. The onset of the illness is abrupt, with pyrexia, coryza, conjunctivitis, a short harsh cough from the respiratory catarrh and sometimes a sore throat. Koplik's spots are pathognomonic and look like grains of salt set on a red base. The rash first appears on the head and rapidly spreads downwards. It is composed of maculopapules which fuse to form blotches. The demeanour of the patient is miserable. Complications like broncho-pneumonia and otitis media may occur early in the disease.

In contacts who are watched a mild pyrexial illness may be detected at the time of infection. In contacts who have been passively immunized the disease may appear in a mild attenuated form.

2. **Etiological Agent.**—A filterable virus.

3. **Source of Infection.**—Buccal and nasal secretions of an infected individual, or articles recently soiled by them.

4. **Mode of Transmission.**—By droplet spread from person to person, indirectly through articles freshly soiled with the buccal and nasal discharges of an infected individual.

One of the most easily transmitted of all communicable diseases.

5. **Incubation Period.**—Seven to fourteen days, rarely as long as eighteen : may sometimes be longer if convalescent serum has been administered during the incubation period.

6. **Period of Communicability.**—From early in the incubation period, i.e. well before the onset of catarrhal symptoms : and until these cease.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—One attack confers permanent immunity in all except rarely. Possibly 5 per cent develop immunity without ever having had a recognizable attack. Miniature attacks, whether natural or occurring after a dose of convalescent serum, etc., confer immunity.

8. **Prevalence.**—Epidemics usually attack more in the spring months and nearly all susceptibles exposed develop the disease.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

(i) *Recognition of the disease.* Clinical symptoms. Special attention should be given to the illness of infection,

the prodroma, e.g. rise of temperature, Koplik spots, and catarrhal symptoms.

- (ii) *Isolation*. During period of communicability.
- (iii) *Concurrent disinfection*. Of all discharges from the patient.
- (iv) *Terminal disinfection*. Thorough cleansing.
- (v) *Quarantine*. Nil, but surveillance of exposed individuals is helpful. In nursery schools it may be justifiable to enforce quarantine so that the disease may be postponed until five and certainly until after three years of age.
- (vi) *Immunization*. Serum or whole blood, in suitable doses, of convalescent measles patients or healthy adults, given to exposed persons within five days from exposure, will prevent the disease. In very young or delicate children prevention should be aimed at; otherwise attenuation should be the objective by using smaller doses of the prophylactic, so that permanent immunity may result from a true attack of modified measles. Gamma globulin, if obtainable, is preferable as it contains the refined active principle. Measles prophylactics are obtainable from the Public Health laboratories. Active immunization is still in the experimental stage. There is a remote risk of homologous serum jaundice following injection of blood products.
- (vii) *Investigation of source of infection*. Unusually unprofitable although interesting.

B. General Measures :—

- (i) Education as to special danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.
- (ii) Passive immunization particularly in institutions for children under three who have not had measles is of value in checking the spread of infection.

10. **Return to School.**—Pupils may return to school in ten days from the date of the appearance of the rash, provided convalescence is established. It should be understood that this period refers only to the probable persistence of infectivity. It may be advisable for the sake of the patient to prolong the convalescent period considerably.

Mumps

1. **Recognition of the Disease.**—Diagnosis usually made on swelling of parotid. In some, a swelling of the submaxillary or sublingual salivary glands or orchitis, may be the only outward sign of

the disease. Inflammation of Stenson's duct may be of assistance in recognizing early stages.

2. **Etiological Agent.**—A specific filterable virus.

3. **Source of Infection.**—Secretions of the mouth and possibly of the nose.

4. **Mode of Transmission.**—By droplet spread from infected persons or contact with articles freshly soiled with discharges from nose or throat of such infected persons.

5. **Incubation Period.**—Fourteen days to twenty-eight days, most commonly eighteen days.

6. **Period of Communicability.**—Unknown, but evidence is accumulating that it is not infectious for more than twenty-four hours before the swelling appears, and ceases to be infectious when the salivary glands return to normal size.

7. **Susceptibility and Immunity.**—General. Immunity follows an attack, but second attacks are not rare.

8. **Prevalence.**—Sporadic and epidemic, more usually in winter and spring. It is less prevalent than other communicable diseases of childhood.

9. **Method of Control**—

A. The infected individual, contacts, and environment.

- (i) *Recognition of the disease.*
- (ii) *Isolation.* Separation of patients from non-immunes and exclusion of patient from school and public places for period of presumed infectivity.
- (iii) *Immunization.* None.
- (iv) *Quarantine.* None. Exposed susceptibles should be regularly inspected for the onset for the presence of the initial symptoms of the disease, such as fever, swelling, or pain of the parotid or other salivary glands, from twelfth to twenty-eighth day from date of exposure.
- (v) *Concurrent disinfection.* All articles soiled with the discharges from the nose and throat of patient.
- (vi) *Terminal disinfection.* None.

B. General Measures :—

None.

10. **Return to School.**—Pupils may return to school on the fourth day after the complete subsidence of the swelling or swellings, provided there are no complications. Mumps may sometimes affect one side of the face only, spreading to the other side after several days, so that complete subsidence should be dated from the gland last affected.

Pediculosis

1. **Recognition of the Disease.**—The discovery of lice or nits. In residential schools the type of infection is likely to be pediculosis capitis. Cervical adenitis is common.
2. **Etiological Agent.**—Head louse or body louse (*pediculus humanus*) and crab louse (*phthirus pubis*). Body and pubic infections are not likely to occur.
3. **Source of Infection.**—Infected persons.
4. **Mode of Transmission.**—Direct contact with an infected person, or more rarely contact with infected clothing or headgear.
5. **Incubation Period.**—There is none in the strict sense, but lice hatch in a week and reach sexual maturity in two weeks.
6. **Period of Communicability.**—While live lice or nits remain on the person or clothing.
7. **Susceptibility and Immunity.**—Not applicable.
8. **Prevalence.**—Widespread, and there was a substantial increase during the 1939-45 war. Lousiness has appeared in unexpected places and medical officers of all types of schools should be on their guard.
9. **Method of Control**—
 - (a) Recognition of cases. Periodic routine inspection of heads may be desirable.
 - (b) Immediate treatment of cases and prevention of contact with others until all lice and nits have been destroyed.
10. **Return to School.**—After thorough examination reveals no sign of lice or nits.

Pertussis (Whooping-cough)

1. **Recognition of the Disease.**—An acute respiratory infection of insidious onset characterized by an initial catarrhal stage in which an irritating cough is difficult to diagnose, followed in a week or two by a paroxysmal stage in which typical, distressing spasms of coughing, whooping, and vomiting occur at very variable intervals throughout the night and day. Mild cases occur without whooping or vomiting. The etiological agent can be recovered by naso-pharyngeal swab, or from cough-plates exposed before the patient's mouth during a cough in the catarrhal or early paroxysmal stage. A lymphocytosis is commonly present.
2. **Etiological Agent.**—Pertussis bacillus of Bordet and Gengou (*Hæmophilus pertussis*).
3. **Source of Infection.**—Discharges from the laryngeal and bronchial mucous membranes of the infected person.

4. **Mode of Transmission.**—By droplet spray from an infected person, or contact with articles freshly soiled with the discharges of such persons.

5. **Incubation Period.**—Commonly three to seven days, but never exceeding twenty-one days.

6. **Period of Communicability.**—Particularly communicable in the early catarrhal stages (reckoned from the seventh day of exposure), and therefore before the characteristic whoops make a diagnosis possible. The catarrhal or initiative stage generally lasts three to fourteen days, sometimes followed by a paroxysmal stage characterized by whooping, which may last from one to several weeks. At the end of the catarrhal stage infectivity rapidly declines, and freedom from infection can again be demonstrated by the absence of the effective agent by bacteriological methods. This may occur as early as the twenty-first day after the onset of the disease.

7. (a) **Susceptibility.**—Susceptibility is general: children under seven years of age are the most susceptible, and those of two years and under to fatal attacks.

(b) **Immunity.**—There is nil naturally. One attack confers a definite and prolonged immunity, although second attacks occur. Active artificial immunity may be developed by appropriate agents, but results in England so far have not been outstanding, although success is reported from active immunization in Denmark and America.

8. **Prevalence.**—Very prevalent and a common disease among children everywhere regardless of race, climate, or geographic locations. Although only 15 per cent of the cases occur in children of two years and under, of all the deaths 85 per cent occur in this early age group. Seasonal incidence is variable, but mortality is higher usually in the spring months. Cyclical occurrence of epidemics is irregular.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

- (i) *Recognition of the disease.* Clinical symptoms, supported where possible by bacteriological examination of "cough-plates", pharyngeal swab, and by blood counts. Serological examination carried out late in the disease may reveal presence of complement-fixing bodies.
- (ii) *Isolation.* Separation of the patient from susceptible children, and exclusion of the patient from school and public places for a period of four weeks from onset, or even earlier in mild cases if proved free from infection by bacteriological examination. Enforced isolation should not mean exclusion of the sufferer from sunlight and fresh air whenever the weather permits.

- (iii) *Concurrent disinfection.* Discharges from the nose and throat of the patient and articles soiled with such discharges.
- (iv) *Terminal disinfection.* Thorough cleaning and airing of the premises, including bedding and furniture used by the patient.
- (v) *Quarantine.* Those who have been exposed who develop a cough should be isolated and supervised by nursing staff. It may be necessary under epidemic conditions to exclude non-immune children from school and public gatherings for fourteen days after their last exposure to a recognized case.
- (vi) *Immunization.* Artificial active immunity is recommended for children between the third and sixth month. This may not prevent the disease, but certainly decreases the severity of attacks. Combined whooping-cough and diphtheria immunization is now advisable.
- (vii) *Investigation of source of infection.* Efforts should be made to discover undiagnosed and unnotified cases, mainly to protect young children from exposure and thus reduce mortality.

B. General Measures :—

- (i) Education in habits of personal cleanliness and in the dangers of association or contact with those showing catarrhal symptoms with cough.
- (ii) Active immunization of susceptibles. Vaccines are being improved and if used should be prepared from recently cultivated strains, be of high strength, and given at intervals not less than two, and preferably, four weeks. Probably within a few years a technique as efficient as the active immunization against diphtheria will be developed against whooping-cough and then it will be wise to advocate mass immunization.

10. Return to School.—Pupils may return to school at the end of isolation if fully convalescent.

The Pneumonias

1. Recognition of the Disease.—An acute infection characterized by a sudden onset with fever and often pain in the chest. Clinical examination will often suggest the nature of the infecting organism. In the pneumococcal variety a chill, pain in the chest, and dyspnoea and a high respiration rate are common. In the type which is often called primary atypical pneumonia the dyspnoea and increased

respiration rate may be negligible. Bacteriological examination may help to confirm the diagnosis, and X-ray examination will often reveal pulmonary lesions undetectable by ordinary clinical methods.

2. **Etiological Agent.**—Pathological bacteria particularly the pneumococcus. Friedlander's bacillus, influenza bacillus, and other pathogenic organisms may cause disease. The primary atypical pneumonia type is in all probability caused by a virus.

3. **Source of Infection.**—Probably discharges from the noses and throats of infected persons or carriers and articles freshly soiled with such discharges.

4. **Mode of Transmission.**—By droplet spread from infected person or carrier or from contact with articles freshly soiled with discharges from the noses or throats of infected persons.

5. **Incubation Period.**—For pneumococcal infections probably one to three days. For virus infections incubation period appears to range from nine to fifteen days, the average being eleven.

6. **Period of Communicability.**—Unknown.

7. (a) **Susceptibility.**—Probably general but worse in wet and cold weather.

(b) **Immunity.**—Immunity to a particular bacterium or virus is assumed to be of short duration, but observations may show that virus pneumonias give a longer immunity.

8. **Prevalence.**—Virus pneumonia appears to occur in small epidemics, whereas bacterial pneumonia appears to occur sporadically.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

- (i) Recognition of disease and notification.
- (ii) Isolation or barrier nursing.
- (iii) Concurrent disinfection. Of discharges from the respiratory tract.
- (iv) Terminal disinfection. Thorough cleansing and airing.
- (v) Quarantine. None.
- (vi) Immunization. None.
- (vii) Investigation of source of infection. Of academic interest.

B. General Measures.

- (i) Overcrowding should be avoided.
- (ii) It may be justifiable for short periods to give prophylactic course of sulphonamides or of penicillin lozenges.

10. **Return to School.**—Pupils should be fully convalescent.

Poliomyelitis and Polioencephalitis

1. **Recognition of the Disease.**—An acute infection of the nervous system characterized by an initial phase of respiratory or gastrointestinal symptoms, a pre-paralytic phase with muscular stiffness and irritability and a paralytic phase. The clinical diagnosis may be obscured by the absence of any one or two of these three phases. The clinically paralytic disease is a relatively infrequent incident in a widespread infection among those at risk. The diagnosis of non-paralytic cases is so frequently uncertain that only paralytic cases should be counted in comparing rates, due precautions being taken in the other cases.

The moderate initial fever may be associated with headache and sore throat or vomiting and constipation. Drowsiness alternating with irritability, hyperæsthesia and stiffness of the neck and spine are usually accompanied by an increase in pressure and in the number of cells in the spinal fluid. There may be tremor and exaggerated jerks, but when the paralytic phase is reached there is flaccid paralysis with diminution of tendon reflexes. In most outbreaks the spinal form of the disease with paralysis of one or more extremities and of the trunk, is much commoner than the bulbar form with involvement of cranial nuclei and the respiratory centre.

2. **Etiological Agent.**—A specific filterable virus.

3. **Source of Infection.**—Discharges from the nose, throat, and bowels of infected persons or articles recently soiled therewith. Infected persons may be recognizably paralytic cases, abortive cases, missed abortive cases, or persons in apparently good health, all of whom may be carriers.

4. **Mode of Transmission.**—By droplet spread from an infected person or carrier, by infection from their fæces or indirectly by contact with articles freshly soiled with discharges from the nose, throat, or bowel of such persons, and possibly by milk or food.

5. **Incubation Period.**—Usually five to fourteen days, unlikely to be more than twenty-one.

6. **Period of Communicability.**—Unknown. Apparently not more than twenty-one days from the onset of the disease, but may precede onset of clinical symptoms by several days. Virus has been shown to be present in fæces for as long as eight weeks after infection but the usual period is up to four weeks.

7. **Susceptibility and Immunity.**—Unknown. Second attacks have been recorded.

8. **Prevalence.**—Variable. Highest incidence is generally late summer and early autumn.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment.

- (i) *Recognition of the disease.* The clinical symptoms may make the diagnosis easy. Examination of the cerebrospinal fluid may reveal increased pressure, a raised protein and lymphocyte content.
- (ii) *Isolation.* Of all cases for three weeks from febrile onset.
- (iii) *Concurrent disinfection.* Of all discharges from the bowels, nose, and throat.
- (iv) *Terminal disinfection.* Thorough cleansing.
- (v) *Quarantine.* Of exposed children of the household and of adults of the household whose vocation brings them into contact with children, or who are food handlers, for twenty-one days from last exposure to a recognized case. Quarantine of twenty-one days should be observed for those exposed in the holidays.
- (vi) *Immunization.* None.

B. General measures during an epidemic.

- (i) Search for and examine all sick children especially those suffering from fever, aches or pains, upper respiratory infections, or intestinal upsets. These should be isolated pending diagnosis.
- (ii) Any member of the teaching and domestic staff should be examined if there are any suspicious symptoms.
- (iii) Nose and throat operations should be postponed in the presence of an epidemic.
- (iv) Although organized games must continue those of an exceptionally strenuous type should be forbidden.

10. **Return to School.**—There will be no chance of further infection by the time the paralytic patient is fit to return again to school life. The abortive case must be free from any suspicious symptom before he returns to school.

Ringworm

Infections with ringworm fungi present varied features according to the part of the body affected and the particular fungus concerned. For simplicity it seems desirable to classify infections according to the part of the body affected.

A. *Ringworm of the Feet*

1. **Recognition of the Disease.**—Any part of the feet may be infected primarily, but infection usually begins in the fourth interdigital space. In the mildest cases only slight scaling is noticed, but in more active cases there may be vesicles or larger blebs, with considerable redness and discomfort. The vesicles may become secondarily infected with pyogenic organisms. In mild chronic infections there is a gradual thickening of the horny layer. The interdigital fold becomes lined with a whitish opaque leathery covering, "soft corns" develop between the toes and painful cracks occur. The hyperkeratosis may spread to other parts of the foot and the nails are often affected, becoming opaque, discoloured, and thickened. A sudden lighting-up of a chronic infection may occur with formation of vesicles as described above. Infection may spread to other parts of the body causing papular, scaly, vesicular, weeping, or crusted patches. Detection of the fungus in scrapings from the lesions confirms the diagnosis.

B. *Ringworm of the Scalp (Tinea tonsurans)*

1. **Recognition of the Disease.**—The characteristic lesions are mildly inflamed, scaly patches, generally round, within which are broken hairs. These are slightly thicker than normal hairs, point in different directions, and have a greyish or frosted appearance due to the sheath of fungus. In trichophyton infections the patches tend to be small and the hairs are broken short that they appear to be absent.

For microsporum infections examination with a Wood's lamp is most valuable as even single, infected hairs fluoresce, but hairs infected by trichophyton do not fluoresce.

Microscopic examination of infected hairs enables the distinction to be made between microsporum and trichophyton infections, but not between those of human and of animal origin.

For culture, hairs should be collected with sterile forceps, placed between flamed glass slides which are strapped together, and sent to the laboratory.

C. *Ringworm of the Groin (Tinea cruris)*

1. **Recognition of the Disease.**—The groin is the commonest site of ringworm in residential schools. A round, scaly, itching patch is noticed usually on the inner aspect of one or both thighs where the shorts have rubbed. The marginated patch spreads to the whole groin and may involve the axillæ also. Search should be made for infection of the feet in all cases of ringworm of the groin. Scrapings for fungus can be examined in cases of doubt.

A. *Ringworm of the Feet*

2. **Etiological Agent.**—Epidermophyton floccosum, Trichophyton gypseum, Trichophyton rubrum.

3. **Source of Infection.**—Probably chiefly infected scales, nail parings, etc., picked up in changing-rooms, bathrooms, etc.

4. **Mode of Transmission.**—By contact with recently soiled articles, e.g. socks or shoes, or with contaminated floors and possibly by auto-inoculation from one site to another.

5. **Incubation Period.**—Unknown.

6. **Period of Communicability.**—As long as the fungus or its spores can be found in the lesions.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—Probably none.

8. **Prevalence.**—Widespread, especially where communal bathing is usual.

9. **Methods of Control.**—As infection is so widespread it is easier to suggest theoretical methods than practicable ones. The following simple methods are, however, suggested :—

(a) Thorough drying of the feet, particularly between the toes followed by the routine use of a dusting powder consisting of 1 per cent salicylic acid in talc or kaolin.

(b) Routine foot inspections for the detection and treatment of cases at an early stage.

B. *Ringworm of the Scalp*

1. **Recognition of the Disease.**—(See previous page.)

2. **Etiological Agent.**—Microsporum (various types of human and of animal origin). Trichophyton (various types of human and of animal origin).

3. **Source of Infection.**—Hairs of infected animals or humans.

4. **Mode of Transmission.**—By direct contact with infected animals or children, or indirectly by contact with articles infected by them.

5. **Incubation Period.**—Unknown.

6. **Period of Communicability.**—As long as infected hairs remain.

7. (a) **Susceptibility.**—Microsporum infections do not generally attack adults, and they tend to die out at puberty. Trichophyton infections affect both children and adults.

(b) **Immunity.**—None.

8. **Prevalence.**—Widespread and increased incidence has been reported from many areas recently. Animal infections have recently been on the increase.

9. **Methods of Control.**—Early detection of cases with isolation and treatment. Contacts should be examined with Wood's lamp. Communal use of toilet articles should be forbidden. Cotton caps should be worn by the infected.

10. **Return to School.**—If isolation has been considered necessary, as soon as it is considered unnecessary.

Tinea Cruris is the site most met with in residential schools. The epidermophyton enters probably through a small abrasion or chap caused by wet football shorts or rough uniform trousers. A round scaly patch is noticed usually on one or both sides of the inner aspect of the thigh where the shorts have rubbed. It is easy to deal with. Daily applications of mild antiseptics of the Dye type, Tincture of Merthiolate, Castellani's Fuchsin paint, etc., preceded by washing with a grease-solvent (Ether-Meth) to ensure the paint penetrating the skin. Seven days is generally sufficient. It is impossible to kill the spores so that recurrences should be watched for and treated at once. The important thing is to avoid causing a traumatic dermatitis by using too strong antiseptics, such as Pigment of Iodine, Cignolin, etc. (even Whitfield's Ointment is too strong for some skins). Fresh spores become implanted on the dermatitis so that it may be impossible to tell whether one is dealing with a recurrence or a dermatitis only. Generally patients may be ambulatory and even continue to play games. Short pants should be worn continuously as a limiting dressing and specially disinfected afterwards.

Rubella

(*German Measles*)

1. **Recognition of the Disease.**—A mild infection with little or no constitutional symptoms, a discrete pink macular rash appearing on the first day of the illness and enlargement of the cervical, sub-occipital, axillary, and inguinal glands. As the rash evolves it may first resemble measles then scarlet fever.

2. **Etiological Agent.**—Probably a filterable virus.

3. **Source of Infection.**—Secretions of the mouth and of the nose.

4. **Mode of Transmission.**—By droplet spread from a patient or by articles freshly soiled with the discharges from the nose or throat of the patient.

5. **Incubation Period.**—From nine to nineteen days, usually 17 to 18 days.

6. **Period of Communicability.**—For probably one day before until the disappearance of the rash.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—One attack usually confers immunity but a few individuals appear to get repeated attacks.

8. **Prevalence.**—General.

9. **Methods of Control**—

A. The infected individual and his environment.

(i) *Recognition of the disease.* Clinical symptoms.

(ii) *Isolation.*—Separation of the patient from non-immune children, and exclusion of the patient from school and public places for the period of presumed infectivity.

(iii) *Concurrent disinfection.* Discharges, if any, from the nose and throat of the patient and articles soiled by discharges.

(iv) *Terminal disinfection.* Airing and cleaning.

(v) *Quarantine.* None.

(vi) *Immunization.* None.

10. **Return to School.**—Pupils may return to school when the rash has disappeared provided there is no persistence of nasal or other symptoms.

Scabies (The Itch)

1. **Recognition of the Disease.**—The characteristic burrows are to be found most commonly on the fronts of the wrists, the ulnar sides of the hands, the webs of the fingers, the anterior axillary folds, the umbilicus and the genitals. (In women the breasts and in infants the palms and the soles are common sites.) The face is characteristically free. The typical lesions may be obscured by secondary pyococcal infections due to scratching. The itching occurs most persistently at night and the transfer of the infestation usually takes place between those sharing the same bed. In those who take frequent baths, burrows may be difficult to find but itching is a prominent symptom.

2. **Etiological Agent.**—*Sarcoptes scabiei* (the itch mite—length about $\frac{1}{70}$ th of an inch).

3. **Source of Infection.**—Infected persons. Clothing is probably not an important method of spread.

4. **Mode of Transmission.**—Direct contact is the common method and infected fomites far less common.

5. **Incubation Period.**—There is no fixed incubation period in the ordinary sense. It should be remembered that the interval between infection and appearance of symptoms may be as long as six weeks in first attacks, but much shorter in recurrent attacks.

6. **Period of Communicability.**—Until mites and eggs are destroyed.

7. (a) **Susceptibility.**

(b) **Immunity.**—None. Re-infestation is possible at any time.

8. **Prevalence.**—Widespread, and became particularly so during the war years when the disease appeared in unexpected places.

9. **Methods of Control.**—Search for cases, especially in the family and household, and prompt treatment of them. It is advisable to wash all infected clothing and disinfest blankets, even though these articles may not be a common method of spread. Recurrences will often recur if the adults in the family are not treated. Thorough treatment is most important. The patient is given a hot bath in which he soaks for ten minutes. He is then dried and painted all over from the neck down with 25 per cent Benzyl-benzoate emulsion. (Benzyl-benzoate 25 grams, lanette wax SX 2 grams, water to 100 mil.) If the treatment is done thoroughly it is, strictly speaking, unnecessary to repeat it, but to be on the safe side it is wise to repeat within six days.

10. **Return to School.**—After efficient treatment the patient is no longer infectious and he may be allowed to return to school at once.

Smallpox (Variola)

1. **Recognition of the Disease.**—The graver form of the disease, variola major, is much more highly infectious than variola minor. It is characterized by constitutional disturbance and a "focal" rash which appears about the third day, becomes secondarily infected and, in those who survive, leaves pitted scars. The onset is abrupt with headache, backache, vomiting, and pyrexia. In the more toxic cases prostration, insomnia, and delirium may herald an early fatal issue. In the milder forms of the disease and in variola minor these prodromata are not pronounced. Prodromal rashes may be erythematous, urticarial, or hæmorrhagic, the last being of grave import. The focal rash is distributed centrifugally (in contrast to the centripetal distribution of chicken pox). It is most profuse in the face and distal parts of the extremities and is more abundant on the prominences such as

shoulders than in hollows and flexures such as the loins and axillæ. The palms and soles are commonly involved. The individual lesions are more deeply situated in the skin than those of chicken pox, although this feature is more characteristic of variola major than of variola minor. The rash passes through papular, vesicular, and pustular stages and, as it evolves more slowly than in chicken pox, the cropping and pleomorphism of the latter disease are not evident. An enanthem in the mouth is usual. Mild and abortive forms of the disease occur in those with residual immunity after vaccination. The virus can be cultivated from the focal lesions and antibodies can be detected in the blood.

2. **Etiological Agent.**—A specific filterable virus—Paaschen bodies demonstrable in scrapings from the base of a vesicle by specific staining methods.

3. **Source of Infection.**—All discharges from the body, lesions of the mucous membranes and skin. Raw materials (like cottons) coming from countries where the disease is epidemic.

4. **Mode of Transmission.**—By droplet spread and direct personal contact ; by articles soiled with discharges from lesions. Contact with raw materials like cotton fibre, etc.

5. **Incubation Period.**—Seven to sixteen days, commonly twelve days. The milder types and persons incompletely protected by vaccination tend to extend the incubation period.

6. **Period of Communicability.**—Most communicable in the earlier stages of the disease, presumably by droplet infection from lesions of mucous membranes. Generally from first lesions, becoming less until the disappearance of all scabs and crusts. "Seeds" in the palm of the hand and soles of the feet are the last to disappear.

7. (a) **Susceptibility.**—Susceptibility is universal, though not every exposure of a susceptible person results in the disease.

(b) **Immunity.**—Acquired permanent immunity usually follows recovery from an attack of the disease. Second attacks are very rare. Artificial immunity by successful vaccination is commonly complete and may last from five to twenty years ; but susceptibility—partial or complete—often recurs after five years and exposed persons may develop a mild or modified form of the disease which may be difficult to recognize. A higher degree of vaccinal immunity, both in the individual and the community, is required to protect against severe strains.

8. **Prevalence.**—Distribution is sporadic or epidemic and varies widely according to the immunity status of the population of an area and its exposure to infection from without.

Variola is one of the three diseases controlled by the international quarantine regulations—this aims at preventing the disease spreading from country to country. Occurrence is most frequent in the cold months and least in the hotter months. There is no regional or climatic limitation to its prevalence except as population groups are more or less well protected by vaccination, or by non-exposure to the disease.

The risk of conveyance is greater now owing to the introduction of rapid transport, whether by boat or plane. The time does not cover the incubation period of the disease.

9. Methods of Control.—A notifiable disease.

A. The infected person, his contacts, and his environment.

- (i) *Recognition of the disease.* Clinical symptoms and previous movements of person. The rapidly fatal or fulminating type and the very mild type with few lesions may easily escape diagnosis until secondary cases appear. The medical officer of health should be consulted in every case of doubt.
- (ii) *Isolation.*—Hospital isolation until all risk of infection has passed. This should apply to all cases, however doubtful, until the diagnosis has been negatived.
- (iii) *Concurrent disinfection.* High pressure steam disinfection of all articles. In absence of this all articles, whether crockery, bed clothing, etc., should be boiled or undergo equally effective disinfection before leaving the sick room.
- (iv) *Terminal disinfection.* Effective disinfection of room and articles followed by thorough cleaning, airing, and sunning of premises and clothing.
- (v) *Quarantine.* Segregation of all contacts until pronounced safe after vaccination with a vaccine of full potency. Daily medical supervision and observation of all recently vaccinated contacts until height of vaccinal reaction is passed, if vaccination was performed within twenty-four hours of first exposure, otherwise for twelve days from last exposure.
- (vi) *Immunization.* Vaccination. Only dermal vaccination is recommended. The reaction at the vaccination site should be carefully observed and recorded on the third and ninth day after vaccination to determine whether the maximum diameter of redness was under three days (= immediate reaction), over seven days (= vaccinia), or intermediate between those two (= vaccinoid). The first is now recognized as the reaction of immunity.

- (vii) *Investigation of source of infection.* The immediate prior case should be sought industriously. Cases of chicken pox or those reported as influenza with spots associated in time or place should be carefully reviewed for error of diagnosis.

The complement fixation tests made with scrapings or scabs taken from suspected persons is now recognized as a test confirming diagnosis in cases of doubt.

B. General Measures :—

- (i) General vaccination in early infancy, re-vaccination of children on entering school, and of entire population when the disease appears in a severe form.
- (ii) Vaccine lymph is now prepared by the Lister institute of preventive medicine and distributed through the source of the laboratories of the E.P.H. service (Circular 103.46, Ministry of Health).

- (iii) The following rules increase the safety of vaccinations :—
Insertion to be small and superficial—the multiple puncture method is recommended.

Primary vaccination at as early an age as is possible.

Particular care should be used in primary vaccination in persons beyond the age of infancy.

The time of vaccination should be adjusted to avoid skin lesions elsewhere on the body, and if possible avoid the warmer months.

Previous immunity is not shown by the results of a vaccination unless a fully potent vaccine was used. The immune, i.e. immediate reaction, is now recognized.

10. **Return to School.**—When fully convalescent. All lesions will by then be healed.

Streptococcal Infections—Respiratory

A. Scarlet Fever

B. Septic Sore Throat or Streptococcal Tonsillitis

1. **Recognition of the Disease.**—*A. Scarlet Fever.* The symptoms and signs are essentially a sore throat and a rash. The sore throat cannot be differentiated from that described under septic sore throat. The rash is a punctate erythema involving the whole body except the face, and most marked in the flexures. The face is flushed and a circum-oral pallor is typically present. The furred tongue with its prominent red papillæ peels to exhibit the red strawberry tongue. After the rash has faded and during convalescence the skin often desquamates. Early rashes can be blanched in the Schultz-Charlton

test. Swabs of fauces grow hæmolytic streptococci. The Dick test, positive at the beginning of the illness, usually becomes negative in convalescence.

B. *Septic sore throat*. The condition is strictly a tonsillo-pharyngitis, with acute onset, sore throat, headache, pyrexia, sometimes vomiting, and other constitutional symptoms. The fauces are injected and the tonsils red and swollen. An exudate is commonly present on the tonsils; it is usually follicular but in the more severe cases may cover both tonsils and resemble membrane. The tonsillar glands are enlarged and tender. The responsible streptococcus is readily cultivated from swabs of the fauces.

2. **Etiological Agent.**—A and B. *Streptococcus pyogenes* (hæmolytic streptococci) Lancefield's group A.

3. **Source of Infection.**—A and B. Discharges from the nose, throat, ears, or purulent discharges from persons infected, and articles freshly soiled therewith. Discharges from carriers may also spread the disease. Infected milk may cause large outbreaks very quickly.

4. **Mode of Transmission.**—A and B. By droplet spread from an infected person, by direct contact with infectious discharges, or indirectly by articles recently soiled with infectious discharges or through contaminated milk.

5. **Incubation Period.**—A and B. One to seven days, usually two to four days.

6. **Period of Communicability.**—A and B. So long as the infectious agent is present in the throat or other discharges. Cessation of clinical symptoms may leave a carrier state. Swabbing, culture, and typing are the only absolute criteria.

7. (a) **Susceptibility.**—A and B. Appears to be universal, except that during an epidemic some individuals appear to be temporarily resistant to that particular type of organism.

(b) **Immunity.**—No immunity has yet been demonstrated to streptococcal infections. If infection occurs from a non-erythrogenic strain the illness is without rash, or B. If an erythrogenic strain infects, those without immunity to it (Dick positive), develop scarlet fever, or A, those with antitoxic immunity (Dick negative) develop the B syndrome.

8. **Prevalence.**—A and B. Common in temperate zones, rare in the tropics. Of higher incidence during late winter or spring.

9. **Methods of Control** (Applies equally to A and B).—Scarlet fever only is notifiable.

A. The infected individual and his environment.

(i) *Recognition of the disease.* Clinical symptoms and the

result of the swab. In the case of scarlet fever notification is necessary.

- (ii) *Isolation*. In a single ward or cubicle where possible. The patient is the most dangerous cause of all cross-infection.
- (iii) *Concurrent disinfection*. Of discharges from the nose and throat of the patient, and articles soiled by such discharges.
- (iv) *Terminal disinfection*.—Thorough cleaning.
- (v) *Quarantine*. None.
- (vi) *Immunization*. By active immunization a Dick positive patient may be made Dick negative ; but this will not immunize him against the infecting organism, the streptococcus, and he will be still liable to B (septic sore throats).
- (vii) *Investigation of source of infection*. Explosive epidemics suggest milk borne infections. A series of cases occurring at intervals suggest a carrier, who is probably someone who has had a recent sore throat.

B. General Measures :—

- (i) Daily examination of throats and temperatures. Swabbing both nose and throat where any doubt exists.
- (ii) Schools should not be closed where skilled daily observation can be provided.
- (iii) Small prophylactic doses of sulphonamides may be justifiable during an epidemic.
- (iv) Pasteurization of milk supply, and exclusion of known contacts or carriers from handling milk.

10. **Return to School**.—Pupils may return to school as soon as convalescence is complete. There must be no sore throat, discharge from the ear or nose, suppurating or recently enlarged glands. Desquamation, *per se*, may be disregarded. A negative swab is usually obtained.

Streptococcal Infections—Non-Respiratory

A. *Erysipelas*

B. *Septicæmia and Surgical Scarlet Fever*

1. **Recognition of the Disease**.—A. *Erysipelas*. An acute febrile infection of the skin, characterized by a red, tender, œdematous, spreading skin lesion with a well-marked raised border. The point

of origin tends to clear as the periphery extends. Face and legs are the most common sites. Recurrences are frequent.

B. *Septicæmia*. An acute febrile reaction to infection or re-infection of a wound by the hæmolytic streptococcus. Apart from the general symptoms of acute infection, there may be a generalized erythematous rash indistinguishable from throat borne scarlet fever. Swabs taken of the wound will grow the hæmolytic streptococcus.

2. **Etiological Agent.**—A and B. *Streptococcus pyogenes* Group A.

3. **Source of Infection.**—Infected material from human sources containing hæmolytic streptococci.

4. **Mode of Transmission.**—Bacteria from the source of infection enter the skin through a wound or abrasion.

5. **Incubation Period.**—24 to 48 hours.

6. **Period of Communicability.**—Until both general and local lesion has completely subsided.

7. (a) **Susceptibility.**—Universal.

(b) **Immunity.**—None.

8. **Prevalence.**—More prevalent wherever there is lack of surgical cleanliness.

9. **Methods of Control**—

A. The infected individual and his environment.

(i) *Recognition of the disease.* Clinically. Erysipelas is notifiable.

(ii) *Isolation.* Important with careful barrier nursing.

(iii) *Concurrent disinfection.* Careful disposal of all dressings and fomites that have come in contact with discharges.

(iv) *Terminal disinfection.*—Thorough cleaning.

(v) *Quarantine.*—None.

(vi) *Immunization.* None known as yet.

(vii) *Investigation of source of infection.*—May be useful and is generally obvious to see where the initial infection started.

B. General Measures. Sulphonamide or penicillin therapy.

10. **Return to School.**—When full convalescence has been established and all lesions are completely healed.

Tetanus (Lockjaw)

1. **Recognition of the Disease.**—An acute disease of the nervous system caused by the toxin of the tetanus bacillus gaining entry and growing in a wound. A history and physical evidence of the wound are usual. Penetrating, contused or suppurative wounds containing foreign bodies provide the most favourable nidus for the organism, although superficial suppuration under a gauze dressing or a crust provides sufficient anærobiosis for the bacillus to develop. Clinically a tonic spasm or rigidity of voluntary muscles is aggravated by distressing paroxysmal contractions occurring first and principally in the muscles of the jaw and neck (lockjaw) and secondarily in those of the trunk and limbs. Localized forms limited to the neighbourhood of the wound occur in subjects with some immunity.

2. **Etiological Agent.**—Tetanus bacillus, *Clostridium tetani*.

3. **Source of Infection.**—Animal fæces, dust from roads, and agricultural implements contaminated therewith. Infected catgut has been a rare source of infection.

4. **Mode of Transmission.**—By infection of wounds, which are usually contused rather than clean-cut.

5. **Incubation Period.**—Usually four to 21 days. Usually the longer the incubation the better the prognosis. Occasionally operative interference with wounds infected even several weeks previously may activate quiescent tetanus bacilli, unless the patient has been actually immunized.

6. **Period of Communicability.**—Patient is not infectious.

7. (a) **Susceptibility.**—General but infection is not always followed by disease.

(b) **Immunity.**—An active immunity may be produced by the injection of tetanus toxoid. The original immunity is best achieved by two doses of 1 c.c. of toxoid, the interval between doses being six to eight weeks. Reinforcing doses should be given periodically, intervals of four to five years being probably ideal.

For those with wounds suspected of being infected with tetanus bacilli, two alternatives are possible. Those previously actively immunized should be given a further dose of tetanus toxoid as this stimulates a greater and more lasting antibody response than that of the ordinary passive immunity. For the immunized, a prophylactic dose of tetanus antitoxin should be given. This artificial passive immunity lasts for approximately ten days. Neither measure is a substitute for hygienic treatment of the wound and definitive surgery.

8. **Prevalence.**—Its greatest incidence in England is among the agricultural population and as many children work on farms in term and especially during holidays, active immunization is particularly useful.

9. **Methods of Control**—

A. The infected individual, contacts, and environment :—

- (i) *Recognition of the disease and notification.* Bacteriology is theoretically useful.
- (ii) *Isolation.* None.
- (iii) *Concurrent disinfection.* Of infected dressing from wound.
- (iv) *Terminal disinfection.* None.
- (v) *Quarantine.* None.
- (vi) *Immunization.* Active immunity for all liable to be attacked, and passive immunization for all thought to be infected, unless previously immunized.
- (vii) *Investigation of source of infection.* Of only academic interest, as the infecting organism is widely spread, especially through animal faeces.

Tuberculosis

1. **Recognition of the Disease.**—Tuberculosis manifests itself by constitutional reactions and local manifestations which vary with the site infected and the acuteness or chronicity of the disease. Symptoms may be inconspicuous and physical signs absent when radiography reveals definite disease. The tuberculin test is usually positive but such a result is not proof of an existing or active lesion : it denotes a state of hypersensitivity arising from acquaintance with the tubercle bacillus, past or present.

Certain clinical syndromes not always tuberculous in origin are accepted as demanding continued observation for the development of definite tuberculosis, e.g. erythema nodosum, phlyctenular conjunctivitis and dry pleurisy.

Tuberculous manifestations in the lungs are commonly classified as primary or first infection type and adult or re-infection type. The primary type produces an X-ray shadow (Ghon's focus) which is not always visible and which may be associated with or followed by hilar shadows and epituberculosis. The vague constitutional and sometimes mild respiratory symptoms usually regress except in the few cases which develop meningitis, miliary tuberculosis, or other progressive tuberculous disease.

The adult type of pulmonary disease is typically insidious in onset although acute forms sometimes occur. Pleurisy with effusion

and unexplained hæmoptysis are almost specific first symptoms. Malaise, anorexia loss of weight, cough, pleural pain, pyrexia, anæmia, and debility are common symptoms. When physical signs are pronounced the disease is almost invariably advanced. Physical signs, such as slight impairment of percussion and a few post-tussic rales, may be difficult to detect even in the presence of marked disease. X-ray examination reveals infiltration of the lungs commonly of the upper lobes. The bacillus should be repeatedly sought in sputum and stomach washings.

2. **Etiological Agent.**—*Mycobacterium tuberculosis* (human and bovine strains).

3. **Source of Infection**—

Human. Sputum from open cases.

Bovine. Infected milk.

4. **Mode of Transmission**—

Human. Droplet and infected fomites.

Bovine. Infected milk.

5. **Incubation Period.**—Slow. A matter of weeks.

6. **Period of Communicability.**—As long as the sputum contains Tubercle Bacilli.

7. (a) **Susceptibility.**—General.

(b) **Immunity.**—Production of artificial immunity is the subject of constant research.

8. **Prevalence.**—Almost universal. A localized mild infection, usually unrecognized, occurs most often during childhood, and appears to confer comparative immunity on some individuals : whilst others become more susceptible to a second, more severe attack. It is this unknown factor in this response which appears to be hereditary.

9. **Methods of Control.**—A notifiable disease.

A. The infected individual, contacts, and environment :—

- (i) *Recognition of the disease* by clinical, X-ray, and pathological examination supplemented by skin testing (Mantoux) and examination of contacts.
- (ii) *Isolation* of suspected individuals and of active cases until proved to be non-infectious.
- (iii) *Concurrent disinfection* of sputum and articles soiled by it, and of dressings from surgical patients.

- (iv) *Terminal disinfection.* Thorough cleansing.
- (v) *Quarantine.* Nil, but observation of contacts.
- (vi) *Isolation.* Still of debatable value.
- (vii) *Investigation of source of infection* is important and all with chronic coughs should be investigated.

B. General Measures :—

- (i) Mass radiography in capable hands.
- (ii) Education of the public to the means of recognizing the mode of transmission.
- (iii) Pasteurization of all milk supplies until herd is tuberculin tested.

10. **Return to School.**—The patient should be fully convalescent and with no signs of active disease.

Vincent's Angina

1. **Recognition of the Disease.**—An infection of the gums, mouth, and fauces which may be acute, subacute, or chronic. The lesions of the tonsils, pharynx, or mouth are typically ulcero-membranous. The gums usually exhibit gingival swelling. Such a gingivitis may be the only sign of the mild chronic form of the disease. In the ulcero-membranous forms there is pyrexia, dysphagia, and enlarged tender cervical glands.

2. **Etiological Agent.**—Vincent's spirochæte.

3. **Source of Infection.**—Oral secretions or discharges.

4. **Mode of Transmission.**—Close contact with infected persons and articles contaminated with their oral secretions : feeding utensils, especially if cracked, also tooth brushes and mugs. Possibly by droplet spread.

5. **Incubation Period.**—A few hours only.

6. **Period of Communicability.**—As long as swabs are positive.

7. (a) **Susceptibility.**—Universal : carious teeth or septic tonsils predispose to infection.

(b) **Immunity.**—None recognized.

8. **Prevalence.**—Varies inversely with the standard of hygiene, both personal and domestic, especially in kitchens.

9. **Methods of Control—**

A. The infected individual :—

- (i) Diagnosis.
- (ii) Isolation. Marked crockery.
- (iii) Appropriate chemotherapy.

B. General Measures.—A careful watch for, and early reporting of all cases of sore throat or gums.

10. **Return to School.**—All swabs should be negative and the patient fully convalescent.



